RURAL SETTLEMENT AND INDUSTRY: STUDIES IN THE IRON AGE AND ROMAN ARCHAEOLOGY OF LOWLAND EAST YORKSHIRE

edited by

Peter Halkon and Martin Millett

YORKSHIRE
ARCHAEOLOGICAL
REPORT No 4.

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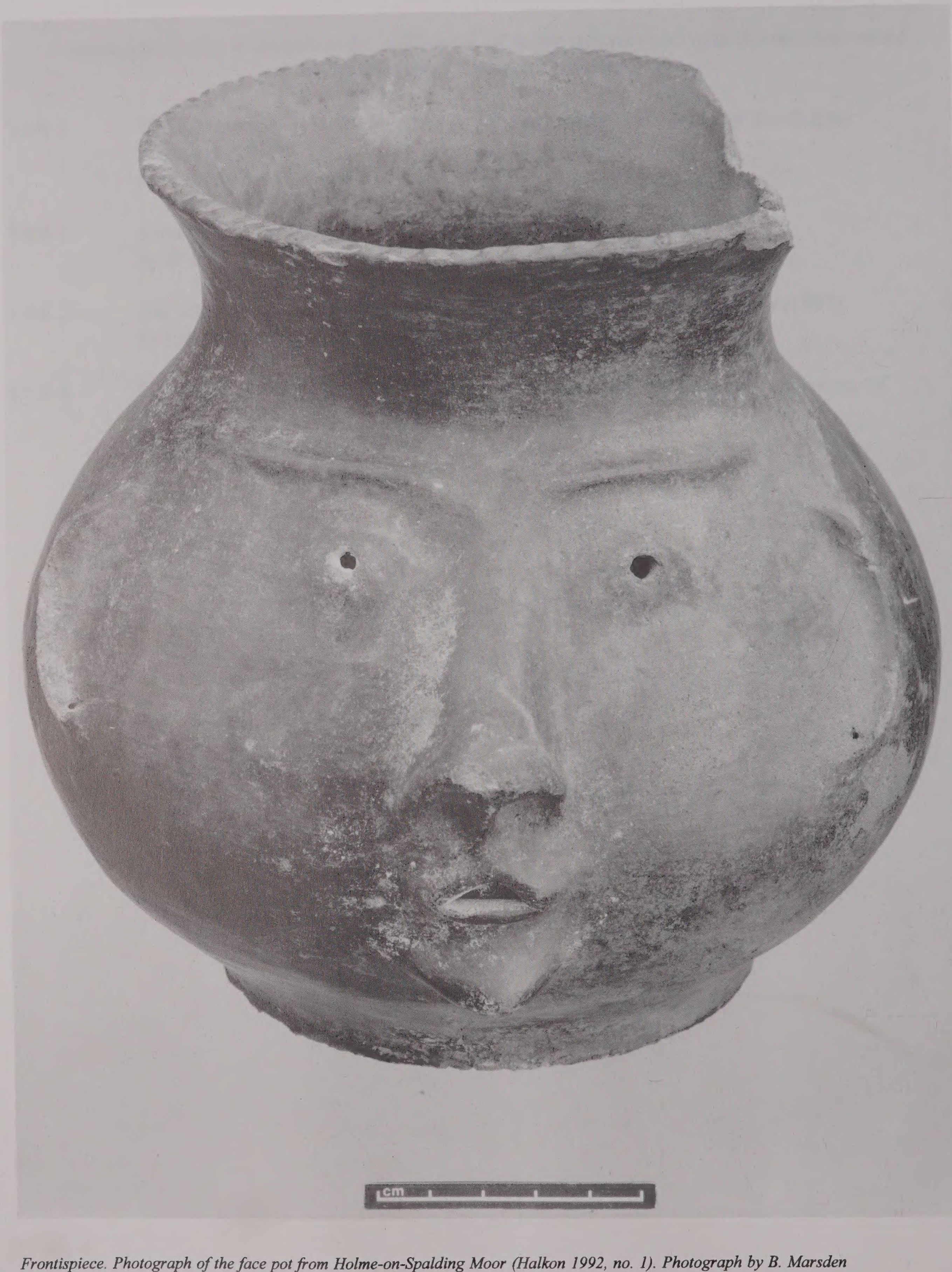

Frontispiece. Photograph of the face pot from Holme-on-Spalding Moor (Halkon 1992, no. 1). Photograph by B. Marsden

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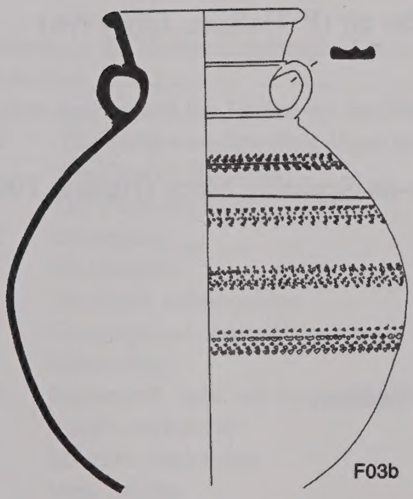
Peter Halkon and Martin Millett

with contributions from

Lindsay Allason-Jones, Richard Brickstock, Philip Clogg, John Creighton, Jeremy Evans, Louisa Gidney, Julian Henderson, Jacqui Huntley, Anthony King, Chris Loveluck, Mandy Marlow, Carol Palmer, Jennifer Price, Sue Stallibrass, Jeremy Taylor and Pat Wagner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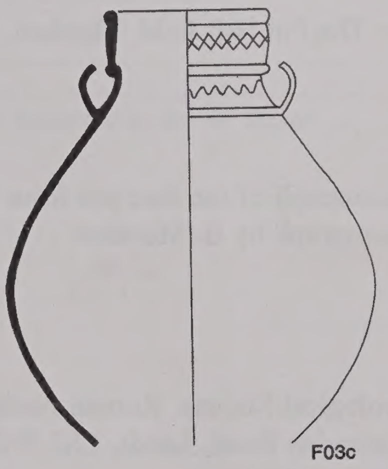
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YORKSHIRE ARCHAEOLOGICAL REPORT No. 4
Yorkshire Archaeological Society, Roman Antiquities Section
and
East Riding Archaeological Society
1999

Yorkshire Archaeological Reports no. 4
Editor: P.R. Wilson
Page Layout: J.E. Wilson

ISBN 0 902122 90 8

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East Riding Archaeological Society and English Heritage 1999

British Library Cataloguing - in Publication data.
A catalogue record for this book is available from the British Library.

The Roman Antiquities Section of the Yorkshire Archaeological Society and the East Riding Archaeological Society acknowledge generous grants towards the cost of producing this volume from British Aerospace, the East Riding Archaeological Society, English Heritage (for *Excavations at Hawling Road*), and the Holme-on-Spalding Moor Education and In Need Charity.

Cover illustration: The Pot Hill field, Throlam, from the air (P. Halkon, July 1996)

Frontispiece: Photograph of the face pot from Holme-on-Spalding Moor (Halkon 1992, no.1).
Photograph by B. Marsden

Published by
Yorkshire Archaeological Society, Roman Antiquities Section
Claremont, 23 Clarendon Road, Leeds, LS2 9NZ
(Registered Charity No. 224083)
and
East Riding Archaeological Society,
(Registered Charity No. 500878)
1999

Printed and bound by
Smith Settle, Ilkley Road, Otley, West Yorkshire, LS21 3JP

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ABSTRACT

This volume presents the definitive results of a field project centred on Holme-on-Spalding Moor in the East Riding of Yorkshire undertaken between 1983 and 1990. It explores the theme of the relationship between agricultural settlements, industrial production and the landscape during the Iron Age and Roman periods. The results presented examine a sample block of landscape through aerial photography and field-walking surveys, demonstrating the use of the whole landscape and the presence of large scale Iron Age iron production and Romano-British pottery manufacture. Excavations on a selection of sites provide detailed information about different components of the landscape. The results of these excavations form the basis of a reconstruction of a niche woodland economy. The volume includes a range of specialist studies and a new typology of the Roman pottery produced in the area.

PREFACE

The fieldwork and excavations discussed in this volume were part of a larger campaign of archaeological work. They are mainly the product of a collaboration between locally-based archaeologists (working under the aegis of the East Riding Archaeological Society) and members of the Department of Archaeology at Durham University. This collaboration began in 1983, but prior to that date local part-time archaeologists had already done much to investigate the archaeology of this hitherto relatively under explored region (see Halkon 1983). The work reported upon in this book concentrates on the later prehistoric and Romano-British landscape. Other work undertaken in the region during the collaboration is related to other themes and is thus being published separately. The Hasholme logboat has already been the subject of a detailed report (Millett and McGrail 1987), whilst papers on the earlier prehistoric finds in the area, the medieval bridge at Stray Farm and the Romano-British roadside settlement at Shiptonthorpe are all in the final stages of preparation. Further field-work and excavation in the broader area, conducted since 1987, will similarly form the subject of future publications.

During the course of the project interim statements of results have been published in various locations (Creighton and Halkon 1990; Halkon 1989a; 1989b; 1990; Halkon and Millett 1987; 1988; McGrail and Millett 1985; Millett 1990b; 1991; 1992; Millett and Gregson 1985; Millett and Halkon 1984; 1985; 1986; 1988; Millett and McGrail 1986). In addition a detailed study of the Holme-on-Spalding Moor landscape block was the subject of Peter Halkon's 1987 MA thesis. The material in the present volume supersedes information in these earlier interim reports.

The finds and archives from the various excavations published here are being deposited with Kingston-upon-Hull City Museums. The museum accession numbers for these sites are:

Bursea House	KINCM 418.1983
Hasholme Hall	KINCM 1249.1984
East Bursea Farm	KINCM 435.1985
Welhambridge	KINCM 305.1985
Bursea Grange	KINCM 1392.1986
Hawling Road	KINCM 11.1989

Accession numbers for the finds from field-walking are listed in the Gazetteer. The field survey results have also been incorporated into the County Sites and Monuments Record.

Organization of the report

The present volume seeks to present the results of our fieldwork on Iron Age and Romano-British sites in an integrated form, focusing on a series of related themes. After a general introduction (Part 1), which outlines the background to the project and summarizes its geographical context, the evidence is organized in a broadly thematic manner. Part 2 presents the results of our study of the Holme-on-Spalding Moor landscape block, with Chapter 2 examining the overall patterns of settlement drawing on the results of aerial photography and field-walking. In Chapter 3 the results of excavations on primarily an agricultural site at Bursea Grange is presented. Chapters 4-6 review the evidence for industrial production within the landscape, based on the results of three excavations together with technological and finds studies. Part 3 is an integrated study of an area investigated during the construction of the Market Weighton By-pass. In Part 4 the broader themes are developed in a wider context, with the final chapter looking beyond the Roman period to the Anglo-Saxon transition.

Although this format may create problems of cross-referencing we believe that it will be more satisfactory to the reader than conventional excavation reports. The descriptions of the sites themselves therefore omit detail which too often render such accounts impenetrable to the reader. We trust that the deposition of the site records with the finds at Hull City Museum will enable the interested researcher to re-evaluate our results should they so wish.

Authorship

This volume represents the work of a wide variety of people. Responsibility for its format lies with the editors who have also written those sections which are not attributed to others. They are jointly responsible for this text with the origination of material in the Chapters 1-2 coming principally from PH and that in Chapters 3-6 principally from MM.

Acknowledgements

None of the work included within this volume could have been undertaken without generous financial support from a variety of organizations:- Dale Farm Foods; Smith and Nephew (Hull); East Riding Archaeological Society; Haverfield Fund, University of Oxford; Holme-on-Spalding Moor Education and In Need Charity; Market Weighton Town Council; Historical Metallurgy Society; Society of Antiquaries of London; Nicholas Payne; The Robert Kiln Trust; Royal Archaeological Institute; Trust House Forte; University of Durham; and Yorkshire Archaeological Society.

Equally the farmers and landowners of the area have been extremely generous in allowing us access to their land and helping in a variety of other ways. We would particularly like to thank the following:- Alan, Sylvia and Michael Johnson, †G. Laverack, S Laverack, Mr and Mrs G Morris, Mr and Mrs R. Morris, John Oliver, Mr and Mrs P. Payne, Christopher Payne, †John Williamson, who permitted us to excavate on their land.

We are grateful to the large number of people who have contributed to the field-work and excavation. We are sorry that space precludes their individual mention. They include members of classes organized through the University of Hull Centre for Continuing Education Development and Training, and the WEA (from Bubwith, Goole, Holme-on-Spalding Moor, South Cave), Wolfreton Adult Education Centre (Humberside LEA), students and staff from Bransholme High School and Wilberforce College, Hull, Bridlington School; members of the East Riding Archaeological Society, and students from Durham University and elsewhere. We would offer particular thanks to the following who have played important roles at various stages of the work:- Victoria Brandon, Andy Boddington, Moraig Brown, Spencer Carter, Phil Clogg, John Creighton, Andi Dutton, Sue Gill, Simon James, Julie Lockyer, Anne Marshall, Sarah Tolks (née Moynihan), Keith Paulin, Jim Pocock, Peter Stephens, Charlotte Walton, Steven Willis and Alan Whitworth. Richard Warde kindly produced a survey of the Bursea Grange site.

The following individuals helped during the fieldwork and finds processing: P. Armstrong, H. Atkinson, G. Bentley, D. Brown, J. Broughton, J. Chapman, I. Chorlton, P. Cottingham, G. Cox, N. Crosby, M. Davis, K. Dennett, L. Dexter, P. Didsbury, P. Douglas, C. Dunn, J. Eastwood, L. Emery, V. Fairhurst, P. Gardam, S. Gibson, A. Gowland, D. Haldenby, T. Hall, T. Hall, H. Halkon, P. Hampel, R. Hewer, N. Hope, B. Huntington, J. Hutchinson, L. Jackson, P. Jackson, R. Ketch, J. Kitchen, J. Leonard, J. Lockyer, R. Mackey, R. Major, J. Marten, C. Mason, S. Midgely, C. Pailing, M. Pailing, L. Parkinson, D. Pattinson, M. Pattinson, D. Priest, T. Rinne, T. Schadla-Hall, B. Sitch, Mr and Mrs Snape, J. Tibbles, L. Wastling, M. Watts, J. Wells, P. Wilkinson and K. Wright.

Several organizations have offered help and support throughout the project. We would particularly like to thank the archaeology staff of Hull City Museums:- David Crowther, Andrew Foxon, Bryan Sitch and Tim Schadla-Hall. Bob Bewley of the RCHME kindly facilitated the production of the aerial photographic plots presented in Chapter 2. John Wilson and John Hicks kindly provided previously unpublished information about the Hasholme excavations.

At Durham, the project has benefitted from the generous support of successive heads of Department, Rosemary Cramp, Anthony Harding and Colin Haselgrove, and from the technical help of a number of staff, especially Yvonne Beadnell, Phil Clogg and Trevor Woods.

The illustrations in Chapters 1-6 and 8 have been prepared by Yvonne Beadnell and Pauline Fenwick. The pottery drawings in Chapter 5 are by Bryan Sitch and were mounted for publication by Hugh Wilmott.

In relation to the work on the route of the Market Weighton By-pass John Creighton would like to make the following acknowledgements.

The initial field-survey was directed by Peter Halkon assisted by I. Chorlton, K. Dennett, S. Gibson, D. Priest, J. Tibbles, R. Ketch, J. Wells, V. Fairhurst, L. Jackson, P. Wilkinson, D. Brown, B. Sitch, P. Jackson, M. Pailing, C. Pailing, D. Haldenby, J. Chapman, P. Gardam, J. Marten, L. Dexter, M. and J. Stringer, G. Bentley, R. Hewer, L. Parkinson and H. Halkon, C. and E. Halkon, as well as by students from Wilberforce Sixth Form College, Hull, and members of the Holme Archaeology evening class.

Warm thanks also to the following farmers and landowners: Mr D. Stephenson, Mr Grundy, Mrs Massey, Mr D.W. Stephenson, Mr K. Levitt, Mr Jibson, Mr Brown, Mr Hobson, Mr and Mrs F. Walkington, Messrs Todd and Thorpe on behalf of Lord Manton, Mr C. Watson, Mr Smith and Mr Levitt.

This excavation was funded by English Heritage, Durham University, Market Weighton Town Council, The Robert Kiln Trust and the East Riding Archaeological Society. Supervision on site was greatly assisted by J. Taylor and S. Preston. The work was undertaken by students of Durham University with additional help from members of the East Riding Archaeological Society and students from Wilberforce Sixth Form College.

Martin Millett coordinated many of the funding arrangements, Peter Halkon coordinated much of the logistical back-up for the project and managed on site during the latter half of the excavation, whilst John Creighton managed on site during the first half of the excavation and coordinated the post-excavation project.

Illus 7.2-7.12, 7.14-7.16 and 7.21 are by John Creighton; Illus 7.1 is by Steve Allen; Illus. 7.13 and Illus 7.17-7.20 are by Nigel Dodds.

The publication of this volume has been supported with grants from British Aerospace, the East Riding Archaeological Society, English Heritage (for *Excavations at Hawling Road*), and the Holme-on-Spalding Moor Education and In Need Charity.

Robert Van der Noort kindly refereed the report for Durham University and Pete Wilson commented on Chapter 7 on behalf of English Heritage.

The authors are extremely grateful to Jill and Pete Wilson for their efforts on the editing and production of the book.

PART 1

GENERAL BACKGROUND

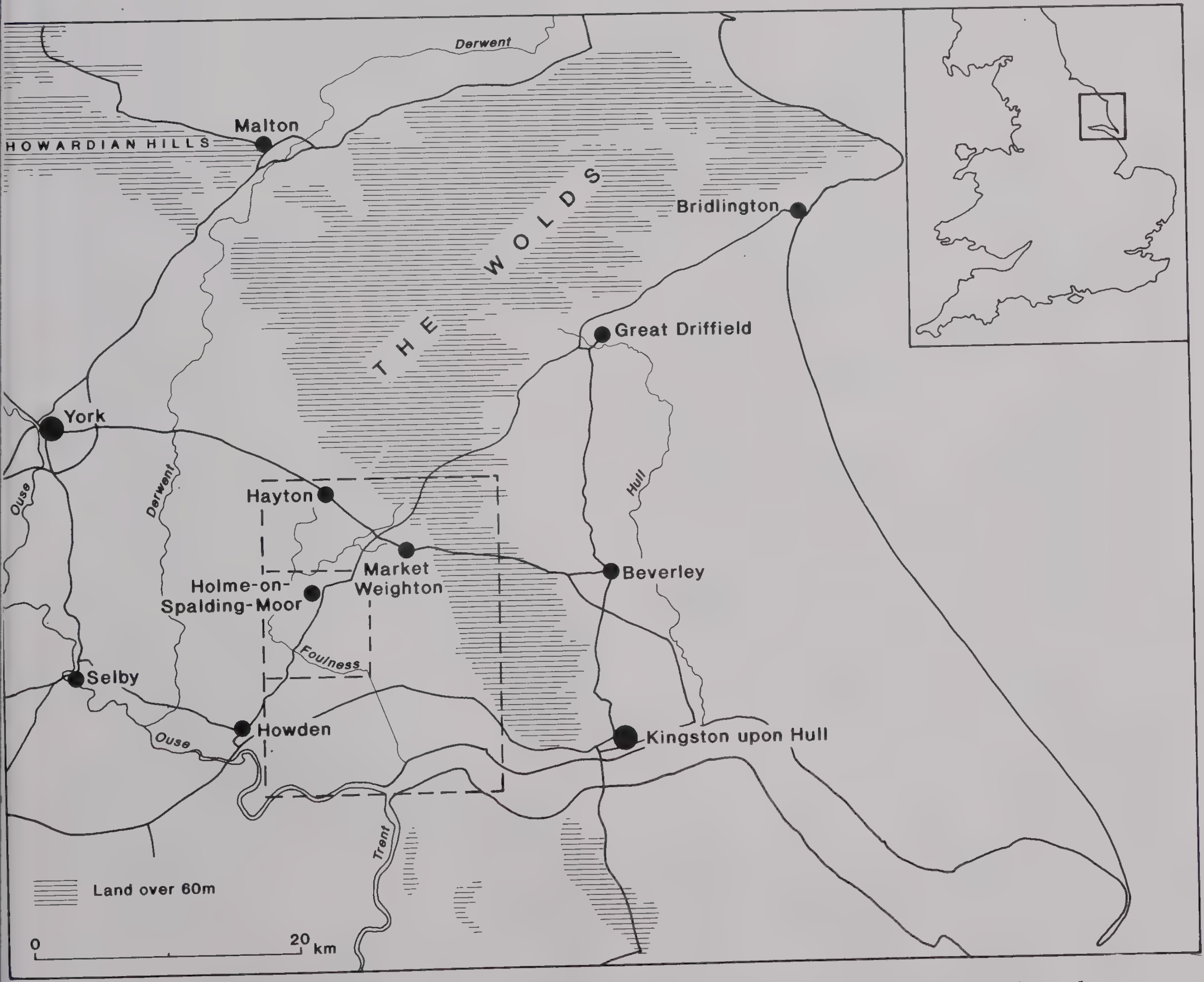
CHAPTER 1

INTRODUCTION

1.1 Background to the project

The area under discussion in this volume (Illus. 1.1) lies to the north of the river Humber in the historic East Riding of Yorkshire (the County of Humberside from 1974 to 1996). It is located within the eastern part of the Vale of York and is centred on the valley of the river Foulness (pronounced Foona). To the north and east is the scarp slope of the Yorkshire Wolds, but the landscape at the foot of these hills with which we are concerned, is low-lying and generally poorly drained. Until recently most archaeological attention in the region has been concentrated on the Wolds with the result that published site distributions present an unbalanced picture of past exploitation of the landscape (Illus. 8.1).

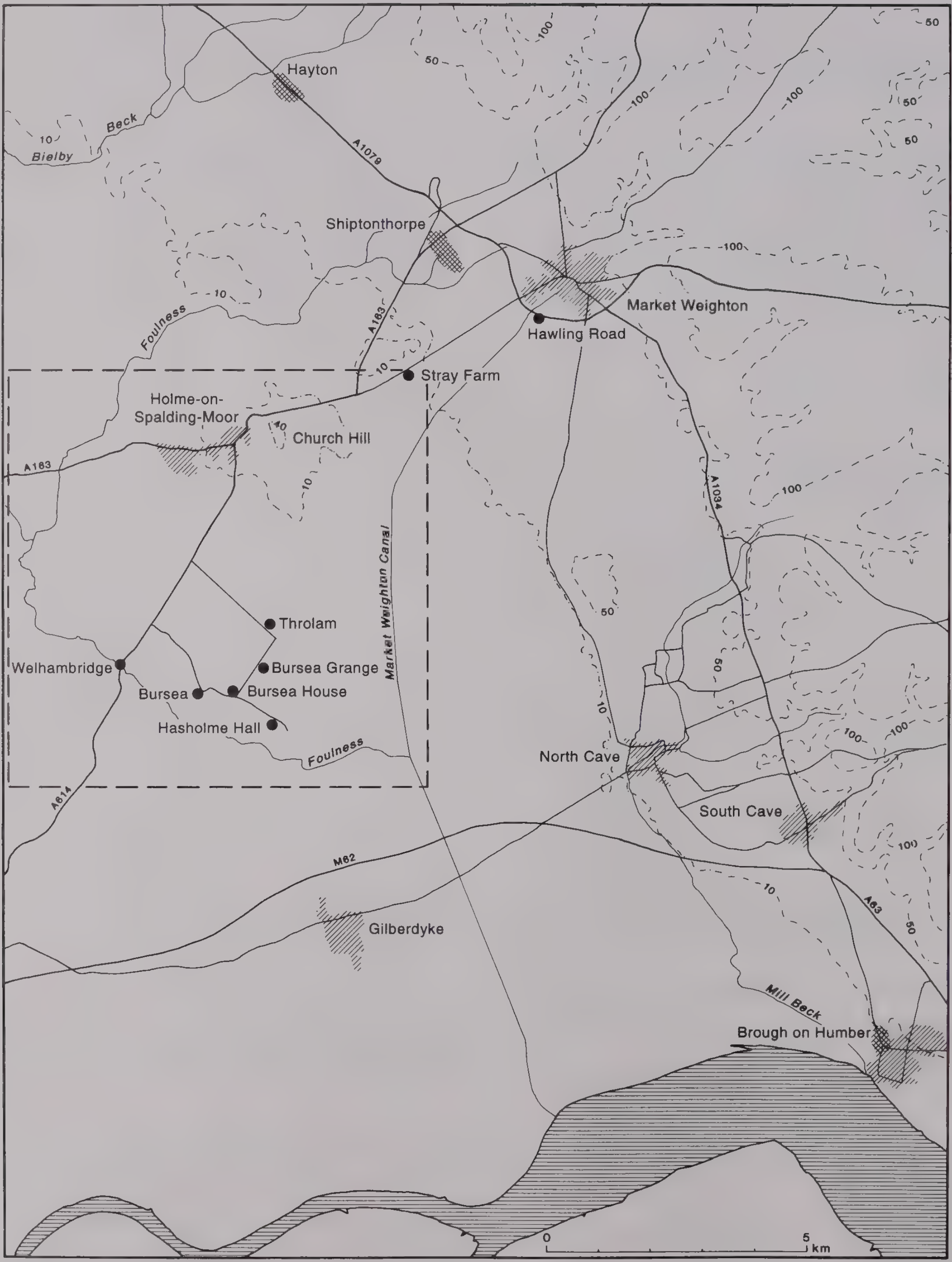
The project which has produced the results discussed here has a dual origin. One of us (Peter Halkon) was brought up at Hasholme Hall, Holme-on-Spalding Moor and took part in excavations on a kiln on his father's farm there in 1970-72 (Hicks and Wilson 1975; below Chapter 5.2). This stimulated an enthusiasm for field-archaeology which endured when he returned to the region as a teacher after graduation. He thus undertook his own fieldwork around Hasholme and Bursea until, in 1980, at the suggestion of Mr Peter Armstrong, it was decided that members of the Field



Illus. 1.1 Map showing the location of the Holme-on-Spalding Moor landscape block and the broader study area

Study Group of the East Riding Archaeological Society should join him in an in-depth study of the area. The other of us (Martin Millett) came to Durham University in 1981 as a newly appointed lecturer and was seeking an area of rural landscape on which to explore ideas about Roman impact on the countryside (cf. Millett 1982). Through the good offices of Tim Schadla-Hall (then Principal Keeper at Hull City Museums) the two of us met and it was agreed that a joint research project would be undertaken.

The project aimed to analyze the developing Iron Age and Romano-British landscape through a combination of techniques. The field-walking already being undertaken under Peter Halkon's supervision was formalized to focus on the Romano-British settlement and industrial patterns in a



Illus. 1.2 *Map showing the topography of the broader study area and the location of the Holme-on-Spalding Moor landscape block in relation to excavated sites*

block of landscape around Holme-on-Spalding Moor (below Chapter 1.2). It was also decided to capitalize on the aerial photographic potential of the area both through collating existing aerial photographs and by initiating a programme of our own. At the same time a series of sites identified through this fieldwork were to be examined by limited excavation, using undergraduate student trainees from Durham University as the core of the work force. These excavations were initially entirely designed to answer research questions, in particular those concerned with the economic and environmental context of industrial production. As the project developed however they came to include a series of rescue projects, the largest of which examined the route of the Market Weighton by-pass (below Chapter 7).

1.2 Research design

Most of the fieldwork reported in this volume is concerned with a sample landscape block around Holme-on-Spalding Moor chosen in order to better understand the Romano-British settlement pattern in the region. This formed the study area for Peter Halkon`s M.A. thesis (Halkon 1987) which comprised 6400ha with its corners at SE 7740, 7732, 8532 and 8540 (Illus. 1.1 and 1.2). It was selected with the aim of examining a representative sample of the soil types on either side of the river Foulness in order to assess the possible influence of soil type and the river system on settlement patterns. Its size was designed to allow a comprehensive programme of field-walking to be carried out within the resources available. The major goals were:

- to examine the relationship between Romano-British settlement and industry
- to assess the distribution and chronology of the settlement and industrial sites
- to examine any factors, such as soils, drainage and environmental change, which may have influenced the patterns of exploitation

The majority of the excavated sites discussed in this report (Illus. 1.2) lie within this landscape block and were selected for excavation in order to elucidate the above issues. These excavations were all completed between 1983 and 1992. Other fieldwork undertaken within the project, but principally concerned with the earlier prehistoric settlement patterns, is to be published elsewhere (Halkon *et al* in prep) whilst the Iron Age logboat from Hasholme has already been the subject of a separate report (Millett and McGrail 1987). In addition, recent research has revealed that a further logboat of probable Iron Age date was found just beyond the survey area at South Carr Farm, Newport (SE 849329) about 30 years ago. This is also the subject of a separate report (Halkon 1997).

After 1986 the project broadened in its geographical scope to examine aspects of a larger area in less detail. The principal excavations later in the campaign were on a Romano-British roadside settlement at Shiptonthorpe. Although that particular excavation is to be published elsewhere, the broadening of the project is reflected in the inclusion in this volume of the report on the Hawling Road site excavated in 1989 (Part 3). This enlarged scope has led us to consider selected aspects of the wider development of the region in the general discussion (Part 4) and for this reason the areas covered by our more general maps has been extended to encompass an area of 18 by 24km stretching from the Roman town of Brough-on-Humber (*Petuaria Parisiorum*) in the south-east to the Flavian fort and associated roadside settlement at Hayton to the north-west. The background data used in the preparation of the maps (Illus.8.1, 8.3 and 8.4) of this area was kindly provided by the then Humberside County Sites and Monuments Record. Whilst these data are both relatively up to date and reliable they are obviously a product more of haphazard processes than systematic research and this should be considered when the maps are consulted. Nevertheless, certain patterns can be discerned and these are discussed below.

1.3 Previous work in the area

1.3.1 The broader region

The south eastern part of the Vale of York is not an area well known for having a high density of Iron Age and Romano-British sites. Current knowledge of Iron Age activity in Yorkshire is dominated by information from the Wolds. Dent (1983) summarizes the large scale settlement excavations at Garton and Wetwang but there remains a relative paucity of published evidence about settlement sites (Cunliffe 1991, 275-77) and archaeological attention has concentrated principally upon burial. The square barrow cemeteries and occasional spectacular chariot burials of the so-called Arras Culture have formed the focus of much past research. Studies of these cemeteries have demonstrated a distribution on and around the Wolds (Stead 1965, fig. 1; 1979, fig. 9; Stead 1991), and it is on these uplands that past research has tended to concentrate (cf. Millett 1990b).

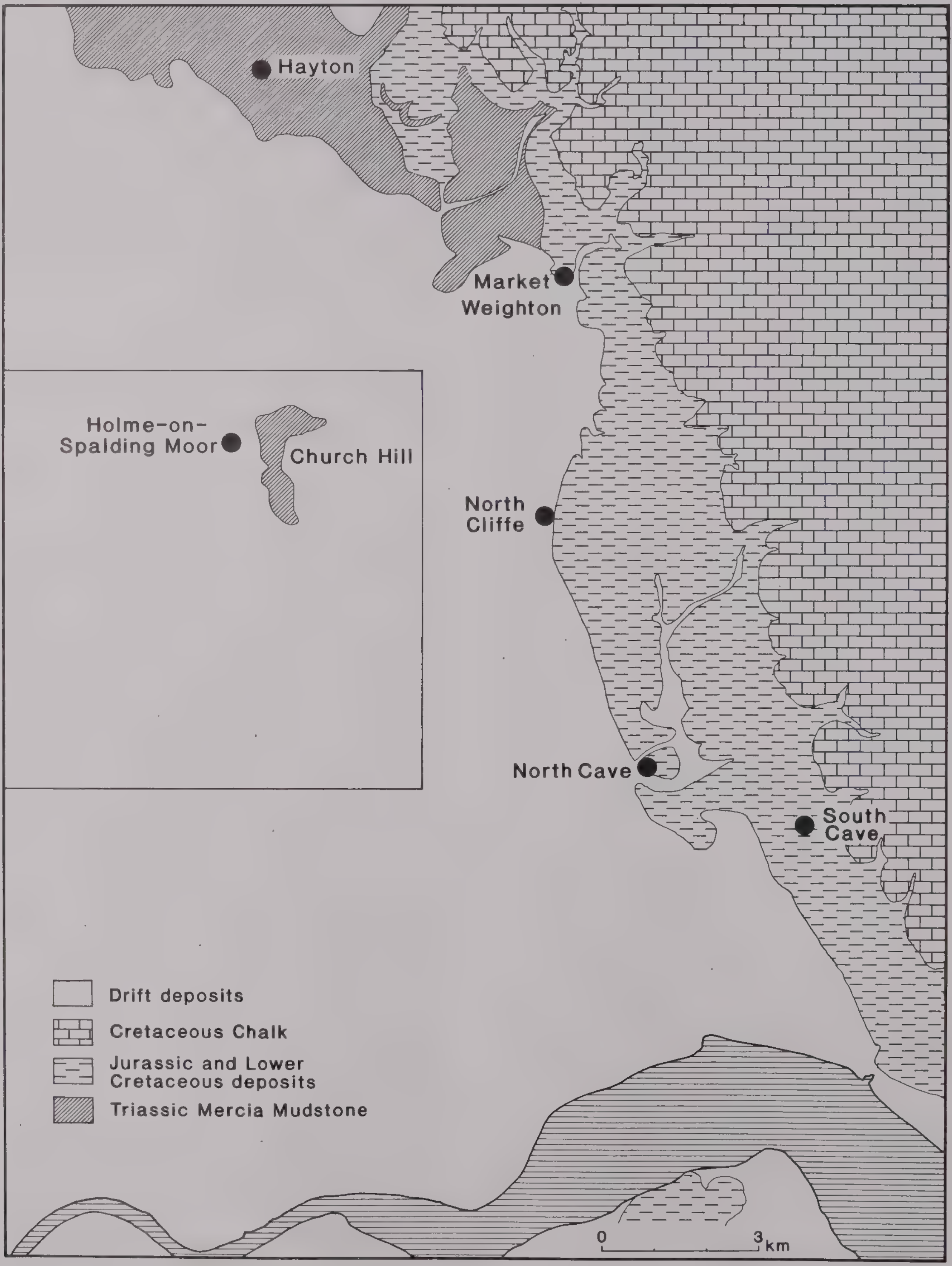
The broad distribution of Romano-British findspots was first established by Mary Kitson Clark (1935). Her map shows a concentration of sites and finds around Brough with the scatter through the remainder of the region largely confined to areas close to the roads from Brough to York and Malton. Villas and more substantial sites were largely confined to the Wolds edge in the vicinity of Brough. Only occasional finds were recorded over the remainder of the area with the notable exception of the pottery kilns in the Throlam area (below Section 1.3.2). These distribution patterns formed the basis for Ramm's synthesis (1978) although aerial photography, largely undertaken by Derek Riley and Jim Pickering especially in the dry summers of 1974 and 1976 had already begun to reveal the complexity of settlement off the Wolds in areas like Holme-on-Spalding Moor (Riley 1977).

Since this work was begun, a major English Heritage funded research project at Hull University has started a systematic examination of the wetlands throughout the Humber region. The first results of this project have now been published and where appropriate have drawn on the unpublished results of our survey (van der Noort and Davies 1993).

1.3.2 The Holme landscape block

> 'When we sees owt we knows nowt aboot, we just say its Roman...and throws it intiv dreean ageean.'

This reply was given by an old drainer to the Revd W. Smith,



Illus. 1.3 Simplified map showing the solid geology of the broader study area

who was investigating a supposed Roman well at Throlam, Holme-on-Spalding Moor (Smith 1923). His answer not only highlights the frequent attribution of artefacts found during agricultural work to the Roman period, but also implies that such finds were common in the area. In 1853 the Revd R. Whytehead gave a number of Roman 'urns' to the Museum of the Yorkshire Philosophical Society, which had been found in Holme-on-Spalding Moor (YPSAR 1853). Other early chance finds of pottery were made at Tollingham in 1873 (Clark 1935) and Bursea Grange 1884-86 (Hull Museum accession no. KINCM 1182.1983), the latter being part of the Mortimer Collection (see also Hicks and Wilson 1975).

A Roman lead coffin was found at Tollingham together with pottery in 1899 (*Yorkshire Weekly Post*, 14 January 1899), but was stolen from outside the vicarage, where it had been used as an ornamental trough (*pers comm* A. Dowson). Further possible evidence for the presence of a Roman cemetery is a fine, near complete 'face pot' shown to the P. Halkon by Mrs Bryde-Williams and Mr A. Bell in November 1990 (frontispiece). The vessel was found during agricultural work by the informant's father or grandfather at least fifty years ago. Although its precise findspot has been forgotten, it is likely to have come from around Holme Hill, as both men did the bulk of their work in that area (Halkon 1992, no. 1).

However it is the large quantities of pottery which had evidently been known from the area for several years which brought the first systematic archaeological attention to the village. In 1930 Thomas Sheppard of Hull Museum and Philip Corder, a school master, visited 'pot hill' at Throlam and later organized an excavation.

> '...Subsequently, with the aid of a large double-decker bus lent by the Hull Corporation, a party of the Hull Grammar School boys interested in historical work was conveyed to "Pot Hill" and carried with them a score of spades, shovels and pickaxes, supplied by the City Engineer, and some new large tin drums lent by Mr Douglas of the Hull Corporation Sanitary Department. A full day was spent,and something like 12 cwt of pottery was brought away as a result of the day's digging...' (Sheppard in Corder 1930, 7)

Further Romano-British pottery kilns were trenched at Bursea House and Hasholme Hall in the 1960s although the work was never published. As a culmination of the interest shown in the area by Mr J. Bartlett of Hull Museum, the East Riding Archaeological Society excavated further kilns at Hasholme Hall in 1970-71 (Hicks and Wilson 1975; below Chapter 5.2). Apart from this, archaeological work in the Holme-on-Spalding Moor district was sporadic although chance finds have regularly been made during cultivation and drainage, and some of these have been followed up by local enthusiasts and the staff of Hull Museum. By 1984 Vivien Swan was able to record the existence of some twelve kiln sites in the Holme-on-Spalding Moor parish while the sites at Bursea, Hasholme, Throlam and Tollingham were fully reviewed by Evans (1985, chapter 3) as background to his major study of the distribution of later Roman pottery in northern England.

The development of metal detecting during the past two decades has had comparatively little known impact on the Holme-on-Spalding Moor area especially in contrast to that witnessed on nearby sites like Shiptonthorpe and Hayton. This is most likely to be the result of the genuine scarcity of Romano-British metalwork from sites in the survey area (below Chapter 8.1). Two exceptional finds have been reported from Holme although we should be very cautious in accepting the reliability of the reported findspots. A Corieltauvian gold stater inscribed VEP CORF (Mack 1975, type 460; Van Arsdell 1989, type 930), dating to the first third of the first century A.D. was said to have been found near Park Farm (SE 818392) in 1989. (Information from Dr A. Burnett, British Museum.) Given the density of Iron Age settlement in this area such a find would not be out of context although the specific location is uncertain and individual Iron Age gold coins often appear to have been deposited in isolation, perhaps in the same manner as hoards (Haselgrove 1987, 216).

A fine but rather worn Bacchic bronze figurine, probably of first- or second-century date, is reported to have been found in the vicinity of the village around 1980. This 75mm tall statuette depicting a kneeling Satyr using his hands to support a large object on his head, is now in Hull Museum (Accession no. 684.1980). It has been fully discussed in Hutchinson's catalogue of Bacchic objects from Roman Britain (1986, 201, catalogue no. Me-11, pl. IVa). There is nothing from the Holme area to suggest a suitable context for this piece and we suspect that it ultimately derives from one of the sites nearby known to be rich in metal objects.

1.4 Geographical context

1.4.1 Geology

The broader landscape block with which we are concerned stretches from the Yorkshire Wolds in the north-east to the Humber in the south. The solid geology is obscured over much of the area by drift deposits, but there is a broad north-south division into three zones (Illus. 1.3). The oldest rocks are found in the Vale of York in the western part of the region, where the Triassic Mercia Mudstone underlies the drift. This series (formerly known as the Keuper Marl) consists of calcareous silty mudstones which rarely outcrop at the surface. The exception is at Church Hill in Holme-on-Spalding Moor where an outcrop of the Mercia Mudstone forms a hill which rises to *c.* 46m, dominating the surrounding landscape which lies at around 8m O.D. A succession of Jurassic and Lower Cretaceous mudstones, oolitic limestones and clays outcrop to the east at the foot of the Wolds scarp where they form a bench which is itself defined to the west by a slight scarp, especially along the stretch between Market Weighton and North Cave. Beyond to the east rise the chalk Wolds. It is the drift however, rather than the solid geology which has most bearing on the nature of the landscape in the study area.

The Selby Sheet (71) of the Geological Survey shows distinctive, varied and complex deposits in the 'Twenty-five foot Drift' of the Vale of York. During glaciation in the Devensian a substantial lake covered much of the Vale of York, since the ice blocked drainage via the Humber Gap. The glacio-lacustrine clays deposited in Lake Humber *c.* 18,000–13,000 B.P. thus underlie the majority of other drift deposits (Catt 1990, 17-19). This almost stoneless blue clay provided the Romano-British potters with their raw material. Overlying the clays are ridges of aeolian and glacio-fluvial sands forming a corrugated surface on a broadly north-west to south-east axis. These were laid down as a result of wind erosion at the margins of the glacier towards the end of the last glaciation, between *c.* 11,000 and 10,000 B.P. (Catt 1990, 24). They create undulations in an otherwise flat landscape, with some of the sand ridges rising locally above 8m O.D.

The remainder of the drift is made up of Holocene alluvium and peat, deposited along the course of the river Foulness and its tributaries as a result of sea level changes over the last 10,000 years (Illus. 1.3). Towards the Humber the river Foulness flows into a now silted inlet. Work by David Jordan showed that this was tidal during a period of *c.* 700 years from 810–530 Cal. B.C. (Jordan 1987; radiocarbon date recalibrated according to Stuiver and Pearson 1986). Current work by the Department of Geography at Durham University is seeking to relate this to broader patterns of sea-level change (J. Innes *pers comm*). The reconstruction of this landscape feature has had a major impact on our understanding of the Iron Age and early Romano-British settlement patterns.

The marked difference in the drainage qualities of the various drift deposits is important for any consideration of areas most likely to have been suitable for settlement. A more detailed insight into the landscape is provided by study of the soil types discussed below (Section 1.4.3).

1.4.2 Topography

To the north-east the chalk ridge of the Yorkshire Wolds rises steeply above the study area (Illus. 1.2). The escarpment generally reaches above *c.* 100m O.D. and its highest points, at Londesborough and to the east of South Cave, rises above 160m O.D. Beyond this ridge the Wolds dip gently away towards the east although the hills are broken by a series of major dry valleys. In contrast, the lower lands of the Vale of York to the west generally lie below 25m O.D. The Wold foot is marked by a bench at around 40m O.D. which is particularly apparent to the south of Market Weighton. Along this a series of springs rise from the base of the chalk to feed the rivers Foulness and Derwent.

In contrast the areas to the south and west of the region are very low lying and are generally poorly drained. Only Church Hill, Holme-on-Spalding Moor, rises above 40m O.D. dominating the landscape. Elsewhere much of the land is below 10m O.D. and significant tracts close to the river Foulness now lie at or below Ordnance Datum. There is a wide variety of soil type, with ridges of aeolian sand creating a better-drained environment for settlement and agriculture (below Section 1.4.3).

1.4.3 Soils

A commentary on the soils in the region (Illus. 1.4) has been published by the Soil Survey of England and Wales. This highlights considerable variation in soil types and notes that the level of detail which could be presented on the 1:25,000 and 1:50,000 map did not allow the more intricate patterns to be shown (King and Bradley 1987, 7). Through the generosity of Dr R. Furness and Mr S. King unpublished material, for the most part consisting of detailed surveys at 1:10,560 carried out in the late 1940s and 1950s by W.R. Heathcote, was therefore consulted in the preparation of this study. Heathcote's mapping has been generalized into basic soil types, whose properties are described in Table 1.1. There is a strong link between soil type and topography and in the absence of detailed contour maps the generalized soil map (Illus. 1.5) provides an idea of the finer relief of the study area (see also Ellis 1990). Ridges of aeolian sand of the Naburn and Holme Moor soil series rise above the plain of the Foggathorpe clays and stretches of low lying 'carr' land where the soil is comprised of silty riverine alluvium and peat of the Sulham/Fladbury complex.

Study of the soils within the landscape block also provides clues as to the suitability of certain areas for settlement and agriculture. In terms of modern land classification most of the area of the survey is Class 3, with only the estuarine clays of the silted tidal inlet being of Class 2 (Ellis 1990, fig. 3.3). Although further work is necessary to determine the exact nature of soil conditions around Holme in antiquity, it is possible to make a reconstruction based on modern soil data. The nature of the soils is thus summarized in Tables 1.1, 1.2 and 1.3.

From these it can be seen that all soil types are subject to limitations, some of these severe, with wetness being the most common. Without modern drainage, cultivation and settlement on the Sulham/Fladbury and Down Holland series would be difficult and these areas were used solely for seasonal grazing until recent decades. The Foggathorpe series clays, which present some problems even today, would also have been unmanageable. This leaves the aeolian sands of the Holme Moor and Naburn series, with their superior drainage qualities as being the most favourable, followed by those in the Portington group.

The soil evidence appears to show that the difference between today's well-managed agricultural landscape and that of the past is superficial, being largely the product of agricultural advances in the modern era. The picture that emerges from the soil evidence is one of ridges of relatively dry aeolian sands standing out in a generally wet and seasonally flooded landscape. This is confirmed by the place-name evidence (Halkon 1983, 5). In such a marginal area, even minor changes in climate and/or sea level would have made significant differences to settlement potential.

Table 1.1

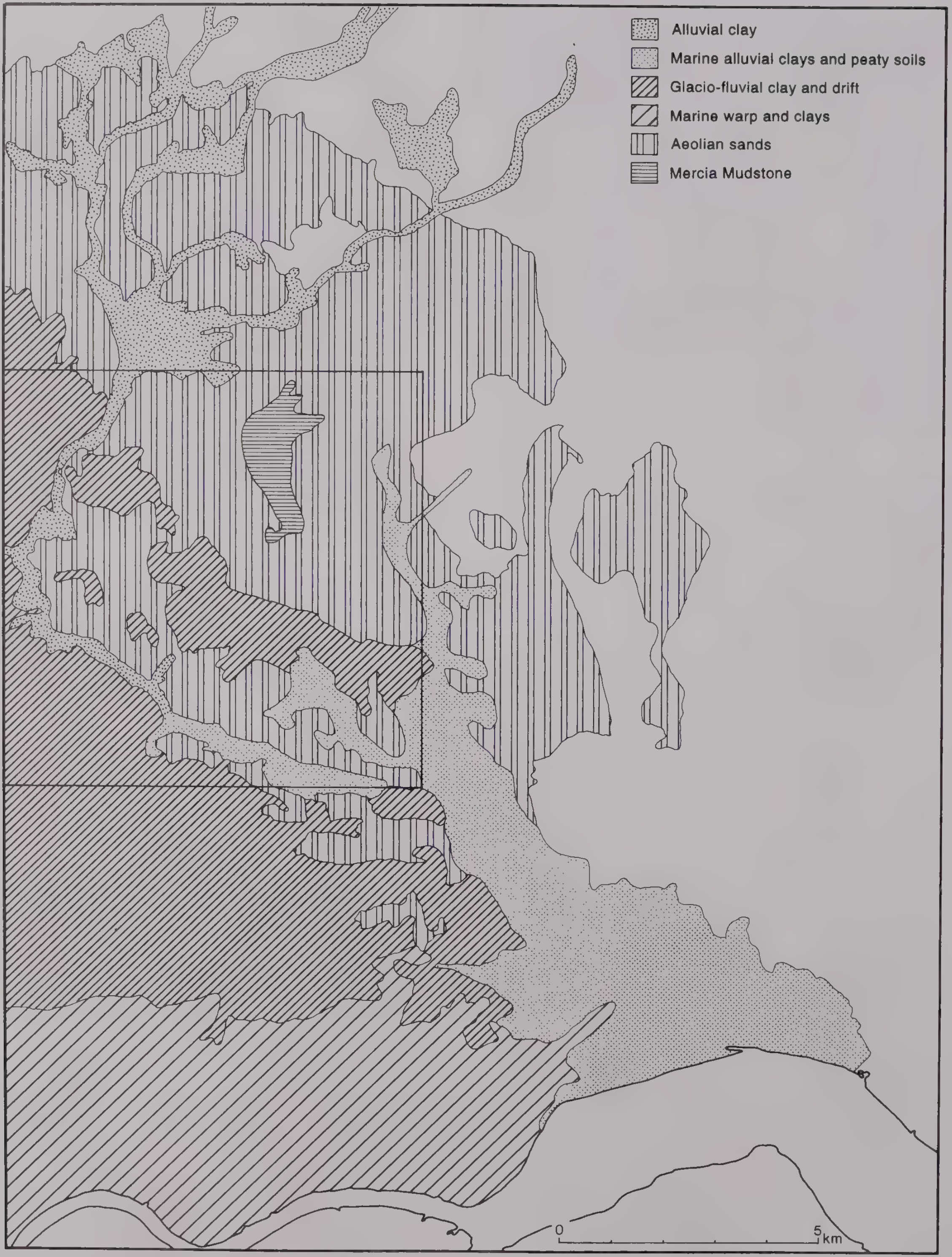
Soil types in the Holme landscape block

Deposit	Lithology	Soil series	Soil group	Wetness class (Table 1.2)	Land capability (Table 1.3)	Relief	Percentage of landscape block)	Area (ha)
Sands (Pleistocene and later)	Fine, sandy, aeolian	Holme Moor Common	Podzolic	III	3 e s	Slopes & crests of recent or fossil dunes slopes *c.* 30°	45.7	2925
Sands (Pleistocene and later)	Fine, sandy, aeolian	Nabum	Brown soil	I	2 e s	Slopes & crests of hummocks, 1–3°	0.5	32
Sands (Pleistocene and later)	Fine, sandy, aeolian	Everingham	Ground water gley	IV	3 e s	Depressions in aeolian sand plain slope 0–1°	6.0	384
Sands (Pleistocene and later)	Sandy loam, glacio-fluvial	Portington	Surface water gley	III	3 w s	Flat or slightly undulating	10.0	640
Glacio-lacustrine (Devensian)	Clay	Foggathorpe	-	IV–V	3–4 w s	Clay plain 5–8m O.D. slope 0–1°	22.8	1459
Mercia Mudstone (Triassic)	Reddish Marl	Worcester	-	IV–V	3 s w	Moderate to steep slopes	2.8	179
Alluvium (Pleistocene and later)	Peat	Down Holland	-	IV–V	3 w s	Flat relief	2.0	128
Alluvium (Pleistocene and later)	Peat over clayey/loamy alluvium	Sulham/ Fladbury	-	V	5 w g	River flood plain, little relief	9.8	672

Notes: Percentage estimated by systematic point sampling (Dalton *et al.* 1980, 13-15)
Soils representing less than 0.5% of the landscape block have been omitted

1.4.4 Drainage

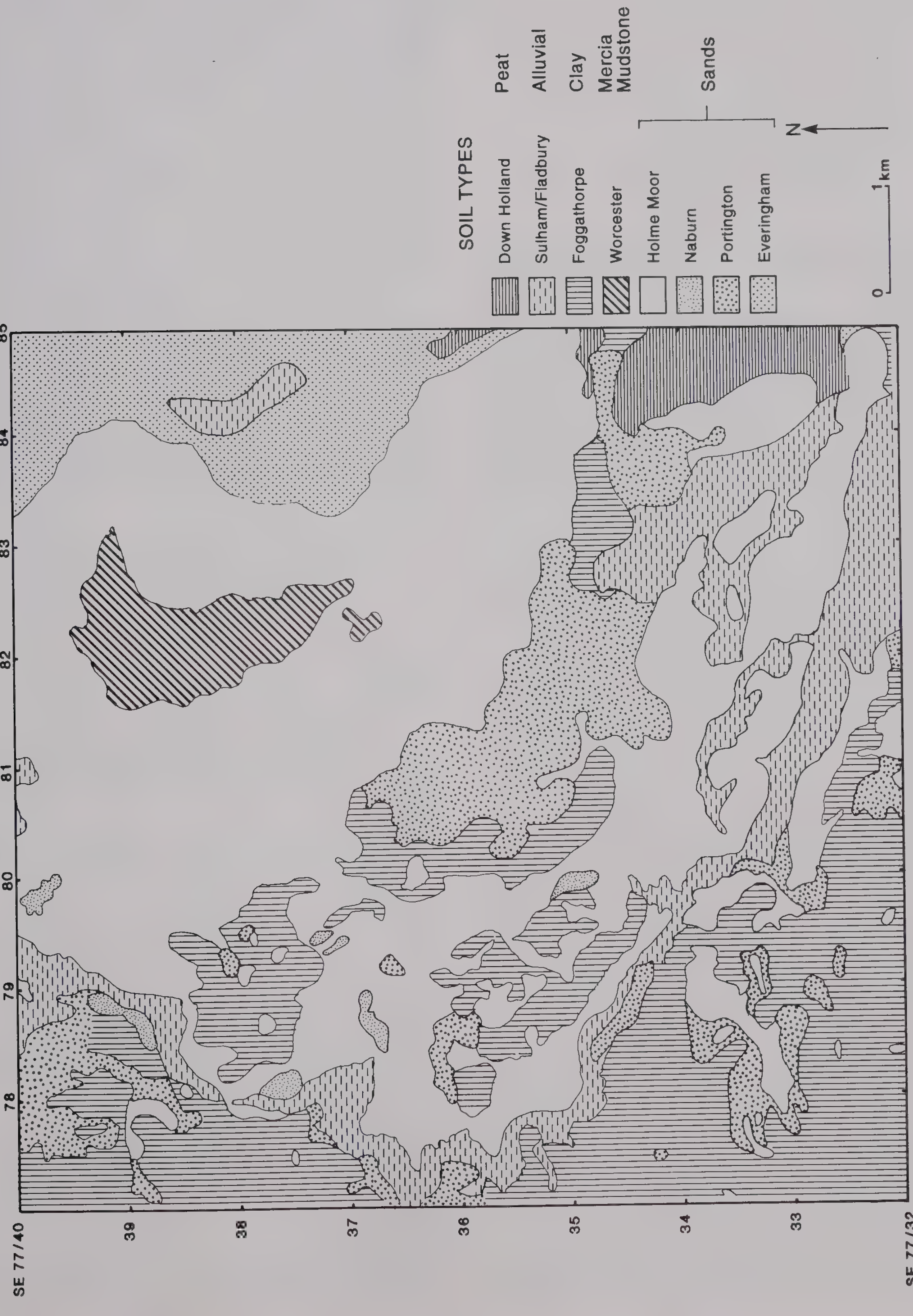
It can be seen from the soil maps (Illus. 1.4 and 1.5) that much of the area would have been waterlogged without modern drainage. They show past and present courses of the river Foulness and the extent of the tidal inlet of the Iron Age and Romano-British periods. The lower reaches of the former courses of the river have been lost through the construction of the Market Weighton Canal in the eighteenth century. In order to better understand the Iron Age and Romano-British site distribution an attempt has thus been made to reconstruct the past drainage patterns within the Holme landscape block using documentary, aerial photographic and environmental evidence (Illus. 1.6).



Illus. 1.4 Simplified map showing the soils of the broader study area. (Blank areas are covered by calcareous soils.)

Documentary evidence

The river Foulness has its source in the foothills of the Wolds at Londesborough (SE 877459) and is fed by a tributary stream which rises near Market Weighton (SE 895435). It flows south-westwards for about 10km before curving south and then turning south-east after only 5km. Until canalized, it flowed thence into the Walling Fen at a distance of about 8 km. Its course thus forms the northern, western and southern parish boundaries of Holme-on-Spalding Moor parish. The Market Weighton Canal was constructed in 1772 and picks-up the river at Wholsea (SE 847316) before draining



Illus. 1.5 Detailed map showing the soils of the Holme-on-Spalding Moor landscape block

Table 1.2

Soil wetness class (from Furness and King 1978)

Class	Average duration per annum without drainage
I	30 days within 700 mm depth
II	30–90 days within 700 mm depth
III	90–180 days within 700 mm depth
IV	180–335 days within 700 mm depth
V	180 days within 400mm depth or 335 days within 700 mm depth
VI	335 days within 400mm depth

into the Humber at Weighton Lock, Faxfleet (SE 874267).

Alterations to the course of the river have been carried out by the Market Weighton Drainage Board, the Yorkshire Water Authority and local farmers. Meanders and bends have been straightened, sections embanked and extensive areas of the river's flood plain drained so that little ancient carr land now survives. The more recent changes were identified through a comparison of the latest Ordnance Survey sheets with earlier editions (O.S. editions 1977; 1908; 1855). Some of this activity was carried out as late as the 1940s (*pers comm* Mr W. Atkinson, who worked on these schemes for the Market Weighton Drainage Board).

Before the Market Weighton Canal was constructed in 1772 'some 20,000 acres were still subject to be overflowed with water for want of proper outfalls into the river Humber' (*House of Commons Journal*, 25 February 1772, quoted in Duckham 1973). According to late eighteenth-century accounts, the area was still subject to flooding despite canalization (Sheppard 1966). The canal did, however, drain a branch of the river running towards Tollingham, which is shown on the 1772 canal survey plan (Smith 1772). This particular branch of the river Foulness is important, as it flowed near Tollingham, one of the major areas of Romano-British activity, which is now at some distance from the present course of the river. A late eighteenth-century map of low lying areas of Hasholme shows that the boundary between Hasholme and Wholsea was formed by the route of this old watercourse (CRO Beverley, D.D.M.W. 7/382). This former branch of the river can also be seen from cropmark evidence which will be discussed below (Illus. 1.6).

An Inquisition of 1664 describes seventeen man-made watercourses draining the area between the rivers Foulness and Humber (Sheppard 1966) and maps by Speed and Morden show the river Foulness meeting the Skelfleet near Hasholme, the former reaching the river Humber between Blacktoft and Faxfleet and the latter at Broomfleet (Metcalfe 1954). The cutting of the Skelfleet has been dated to *c.* 1425 (Sheppard 1966) and suggests the need for draining the area and providing another outfall into the Humber. There are numerous medieval charters referring to commissions for the inspections of banks, drains and other watercourses, both artificial and natural (Allison 1979). Without this drainage, much of the very low lying area would have been flooded and there is plentiful evidence showing that this was frequent (Hall 1892). Several charters provide topographical information concerning the Holme area. A grant of land to the hospital of St Giles in Beverley, dating from 1185 to 1215 refers to an area of Holme being *'Pars est in arida terra et alteram est in marisco'* (Clay 1965). Another charter dated 1230-51 refers to 'Risebriggker' (Clay 1965). The derivation of this word has been given as a brushwood trackway (Smith 1937, 235). During the straightening of a bend in the river Foulness in the 1940s, such a brushwood trackway was discovered (*pers comm* Mr F. Hawcroft, Sikes House Farm). Trackways such as these would presumably be very necessary for crossing the marshy areas. A further charter, granting land to Selby Abbey (1210) includes a reference to drainage: *'In latitudine a terra mea que vocatur Schiraykes per medium le Flet usque ad Fulna ad conductum aquae.'* (Clay 1965, 72).

The earliest documentary reference to the river Foulness occurs in a charter of King Edgar dated to A.D. 959 granting lands in Howdenshire and describing their boundaries. This is generally agreed to be genuine and it is worth quoting as it mentions several important topographical details relating to landscape and drainage during the later Anglo-Saxon period. Hart (1975) and Metcalfe (1954) have reconstructed the boundaries and identified the places mentioned. The Charter runs as follows:

> 'These are the bounds of Howden. From Usan, up Wilbaldes Fleote to the "Dic". Along the "Dic" to Deorwentan right on to Caerholm, along the dyke all round the wood to the Fulanea, to Ealdon Deorwentan back to the Usan.'

Hart (1975, 112-3) suggests the following interpretations:

Usan = river Ouse
Fleote = fleet, a common name for local drainage dykes or creeks. (The proposed route for this is from

Table 1.3

Land capability class (from Furness and King 1978)

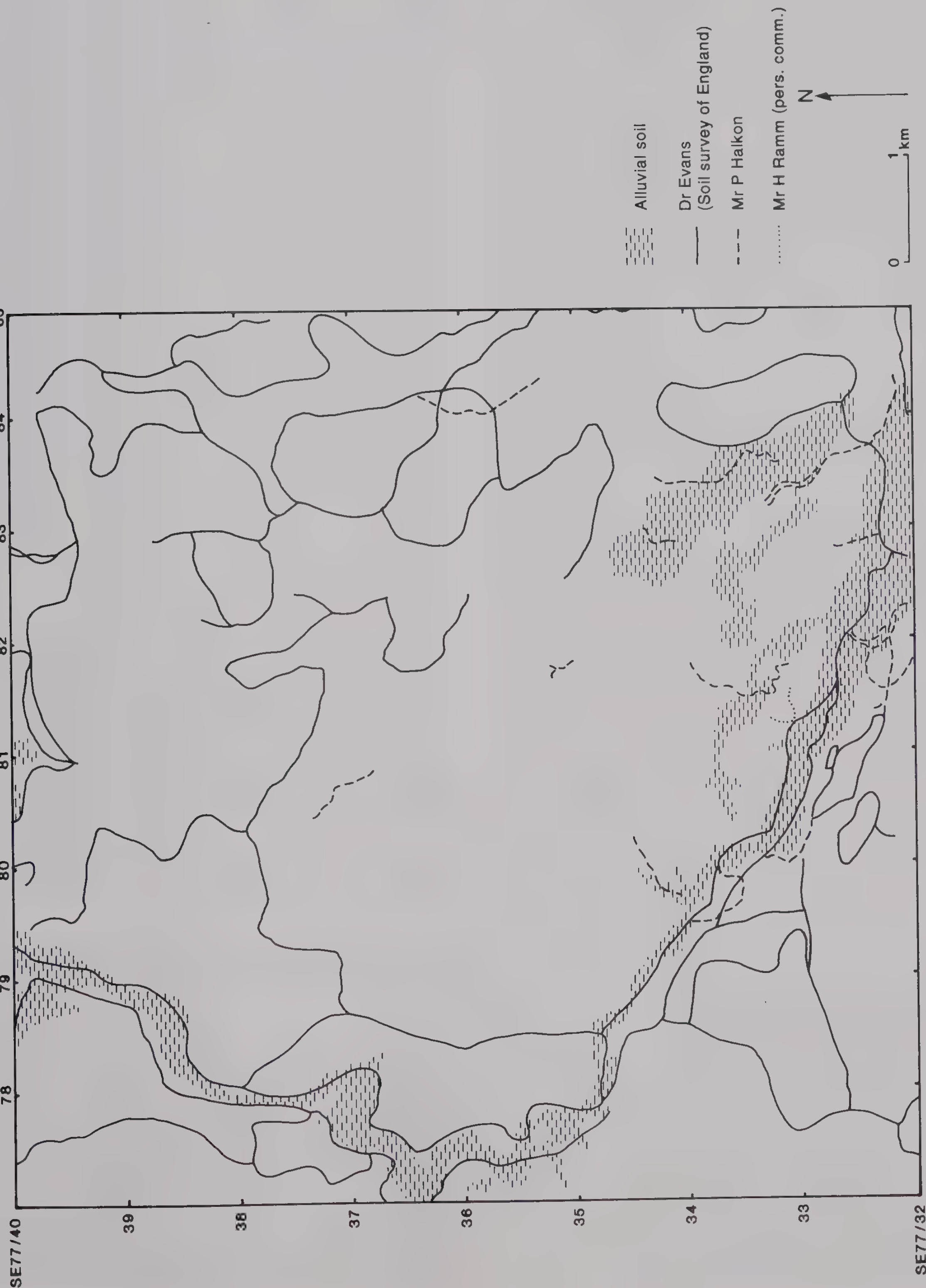
(There is no class 1 land in the area)

Class 2	Minor limitations reducing choice of crops and interference with cultivation
Class 3	Land with moderate limitations that restrict choice of crops and/or demand careful management
Class 4	Land with moderately severe limitations that restrict choice of crops and/or demand very careful management
Class 5	Land with severe limitations that restrict its use to pasture and forestry

w = wetness
s = soil limitations
g = gradient and soil pattern limitations
e = liability to erosion

Asselby to join the Ouse at SE 725260)
Dic = dyke
Deorwentan = river Derwent (SE 700300)
Caerholm = Holme on Spalding Moor?(SE 805385)
Fulanea = Foulness (SE 775345)

The equation of Caerholm with Holme-on-Spalding Moor has been questioned by Wales (1990), who suggests that Barnhill, a prominent sand hill just to the north-west of Howden, is a stronger candidate. Wales would also dispute the exact course of the boundary referred to in the charter. The references to 'Wilbaldes Fleote' and the 'Dic', however,



Illus. 1.6 Map showing evidence of past and present drainage channels in the Holme-on-Spalding Moor landscape block. Note that the various streams are not all contemporaneous and portions of various of them are only incompletely known

are important as the vocabulary is reasonably interpreted as showing that drainage had been carried out before A.D. 959. Even if Caerholm does not refer to Holme-on-Spalding Moor, despite its name being derived from the Old Norse 'carr'– a marsh or water meadow and Holm – an island or hill, a meaning close to that of the present place-name, it still presents the picture of a wet landscape (Smith 1937, 235). As yet there is no supporting evidence for the alternative interpretation of 'Caerholm' – a fortress on a hill.

The charter goes on to list the townships of Howdenshire, Knedlington, Barnhill, Cavil, Thorpe, Hive, Eastrington, Belby and Kilpin. When plotted against the geological drift deposits, five out of eight of these townships are located on the sand and gravel deposits which are higher and drier than the surrounding area, some separated by alluvium, forming islands of settlement in tracts of marshland (Metcalfe 1954, 9). A further interpretation of the charter has been given by Long who also points out that Hive, just to the south of the Foulness, is quoted in the original charter as *hyde* meaning a landing place on a river (1993, 132).

At present, a large proportion of the area immediately south of the river Foulness is between 3m and 1m below the average level of the Humber at normal spring tide. Without major embankment, most of this tract of land between the higher ground along the southern stretch of the river Foulness would be inundated. Pethick (1990) suggests that the approximate present day sea-level was established around 3,000 B.P.

The only real expansion of settlement in the Middle Ages in the Walling Fen took place along the new drains (Sheppard 1966; Metcalfe, 1954). Documentary and soil map evidence coalesce in showing the limited nature of environmental change; even with modern drainage and embankment, various areas in the southern part of the landscape block are flooded at certain times in the year (eg. in the winter of 1993).

Aerial photographic and soils evidence

This section attempts to reconstruct the river system within the landscape block before the construction of the Market Weighton canal using the following evidence:

- Humberside County Planning Department aerial photographs held at Beverley
- National Monument Record (henceforth N.M.R.) aerial photographs
- Air photographic plots of river systems held by the Soil Survey of England office, Bishop Burton
- Plots of watercourses by Mr H. Ramm formerly of the Royal Commission on Historic Monuments, York.

Illus. 1.6 shows the watercourses revealed by these sources. There are a large number of minor watercourses which meander across these low areas, most lying on alluvial soils of the Sulham/Fladbury soil series. They probably represent a palimpsest ranging in date from at least 10,000 B.P. onwards. As yet only the creek system which contained the Hasholme Boat has been dated. Precise dating of the remaining elements must await the outcome of the programme of research being undertaken by the Department of Geography at Durham University, but for the present we have to rely of a variety of other indications of their age.

Evidence from the excavation of the Hasholme logboat (SE 821327) has demonstrated that the estuarine creek was open to the sea during a period *c.* 700 years from 810–530 Cal. B.C. Jordan (1987) suggests that this watercourse was part of a dendritic creek system running into the Humber Estuary (Illus. 1.4). Even after the marine regression this feature is likely to have remained at least seasonally waterlogged and perhaps flooded with fresh water. The clustering of Romano-British kiln and settlement sites around the same feature at Bursea (SE 813335) also suggests that, although no longer marine, the creek may have remained navigable into the Roman period. This watercourse appears on the soil map (Illus. 1.5) as a finger of alluvium, broadening out just south of Bursea House. The meaning given for Bursea as the 'byre by the lake' may indicate that there was open water here in the early medieval period (Smith 1937, 235). The field in which the watercourse ended was still known as 'the bog' in the eighteenth century and despite modern drainage, water still collects in the depression formed by the stream channel. Other watercourses linked to ancient courses of the river Foulness show up as crop and soil marks south of Welhambridge at SE 795335, in an area still known as 'The Sikes' (sikes – small watercourse). The presence of numerous small streams, many of which no longer exist as running watercourses, are also evidenced by more recent place-names like Runner End (runner – a small stream) at SE 805384 and Water End, SE 789383, which are both near such watercourses.

The discovery of a medieval bridge at Stray Farm, Holme-on-Spalding Moor (SE 845397) in the summer of 1986 (Halkon 1989b) showed that this stream had been bridged during the twelfth–thirteenth century and also that there was an earlier, broader peat-filled river channel. This was possibly open water during the Romano-British period, especially if the proximity of sites to it in the Throlam and Tollingham area is taken into account. The aerial photographs showing the course of this stream at Tollingham (SE 842355) also reveal a number of Iron Age and Romano-British enclosures near to it (NMR SE 8435/13 284). This relationship was also noted by Evans (1985, 95).

1.4.5 Reconstructing the coast

Sheppard (1966) suggested that the Walling Fen was once a large saltmarsh, extending from near the junction of the rivers Derwent and Ouse eastwards to Brough, some 6 km wide. Soil and geological maps clearly define this inlet now filled with alluvium and estuarine clay. Jordan's (1987) work at Hasholme has now demonstrated that this inlet was marine during the later Iron Age. The Roman town of Brough-on-Humber (*Petuaria Parisiorum*) and the villa at Brantingham (SE 932287) were thus located near its eastern shore. Indeed at Brough field boundaries shown on the

Ordnance Survey maps fossilize successive shorelines (*pers comm* P. Armstrong). The Romano-British sites of Faxfleet A and B (SE 87472573) (Bartlett 1968; Sitch 1990), lie at the south-western corner of this inlet. Faxfleet site A produced material largely from the Iron Age and early Roman period and is below the present waterline; site B, which produced later Roman material including Holme-on-Spalding Moor greyware pottery is at a higher level (Bartlett 1968; Sitch 1990; *pers comm* Mr J. Leonard). Mr Leonard also reports finding Romano-British material in a possible watercourse running north-north-west towards Hasholme which follows the reconstruction given by Ramm (1978, 111).

There is a paucity of evidence for Romano-British settlement between Faxfleet, Holme and Brough (Illus. 8.3), although some pottery has been found at Gilberdyke and Blacktoft (Clark 1935; Loughlin and Miller 1979 – wasters listed there as being found at Newport are in fact from Bursea Grange, Holme-on-Spalding Moor; KINCM 1182.1983). If this negative evidence is a true reflection of the settlement pattern, the Roman centres at Brough and Faxfleet lie on either side of the mouth of the inlet, and Holme, with its ridges of Holme Moor aeolian sand provided the first dry land north of the inlet. This creek system gave access to the Wolds foothills and the rest of the Humber drainage basin whilst its existence determined the course of the Brough–York Roman road (Illus. 8.3). The feature is thus crucial to our understanding of the development of Iron Age and Romano-British settlement in the whole region.

Given the low lying nature of the Humber basin and the southern portion of the Holme landscape block, marine inundation has in the past been suggested as a reason for the end of the Romano-British settlement and industry in this area. Ramm (1978, 124), Radley and Simms (1970, 1-16) and Eagles (1979, 190-93) have all argued that marine flooding was responsible for the decline of Roman York and settlements in the Humber basin such as Brough and Faxfleet. However, there are serious doubts as to whether such a transgression occurred during the later Roman period. Excavations undertaken in Rougier Street at York (Pearson 1985) have failed to find evidence for the cataclysmic late Roman flooding once thought to have been identified in the city. Indeed Hall (1978, 32) has stressed that no such flood deposits have been found on any excavation in the York.

At Brough, Wacher (1969, 78-79) postulated that a major cause of decline was the accumulation of about 1m of silt over shingle created by marine flooding. A further site of the Roman period at North Ferriby (SE 980250) was reported by the original excavator as being covered with around 0.25m of marine clay (Wright and Wright 1947). At South Ferriby sluice (SE 976211), where Romano-British occupation occurred on slightly raised banks beside the river Ancholme, the site was overlain by nearly 2m of light brown clay, which was identified as representing further marine transgression (Smith, A.G., 1958). At Faxfleet (SE 875257) however, the layer of deposit over the Romano-British site has now been identified as up to 0.5m of modern Humber warp (Bartlett 1968, 5; J. Leonard *pers comm*) rather than a fourth-century flood deposit. Such warping, produced by allowing high tides to flood through sluice gates and deposit their sediment, was common in the nineteenth century (Heathcote 1951; Ellis 1990). Given the lack of analytical work on the deposits listed they certainly cannot be relied upon as evidence for flooding. Indeed, a systematic programme of fieldwork, sampling and soil analysis is needed to differentiate natural and warp deposits along the Humber.

There is equally no evidence for any great marine inundation ending the Romano-British pottery industry of Holme-on-Spalding Moor around A.D. 370 as Eagles (1979, 197) suggested. On the contrary Evans has argued (1985, 305) that the Holme kilns continued in production after this date.

In an area of such localized topographical variation it is difficult to make any generalized statement about the effects of marine flooding, although it is likely, given the low lying and marginal nature of the land around Holme, that minor changes in climate and/or sea level would have made significant differences to settlement potential.

PART 2
THE HOLME LANDSCAPE BLOCK

CHAPTER 2

SETTLEMENT PATTERNS IN THE HOLME LANDSCAPE BLOCK

2.1 Introduction

Detailed studies of the settlement patterns in the sample area around Holme-on-Spalding Moor (Illus. 1.2) rely principally on two forms of evidence, aerial photography and field-walking. The results of the two methods are presented separately in this chapter together with a synthesis of the results.

2.2 Air photography and the Holme-on-Spalding Moor landscape

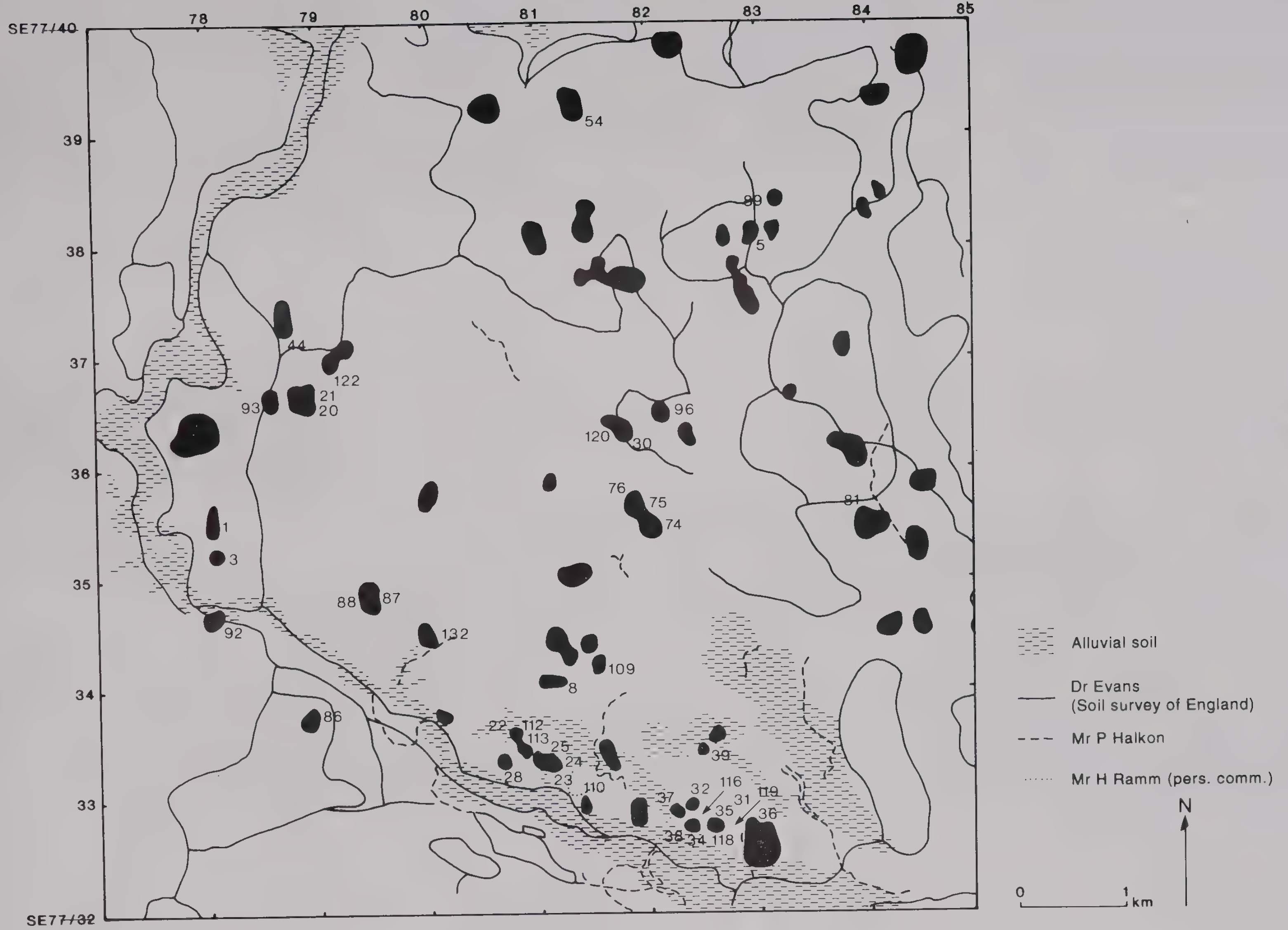
by Jeremy Taylor

The aerial photographs of the Holme survey block came from a wide variety of sources, particularly the National Monuments Record and Cambridge University Committee for Aerial Photography, supplemented by photographs taken by Halkon and Millett during the course of the project. Coverage, though plentiful in places has not been systematic, mainly concentrating on known cropmark areas around Bursea (SE 8134), Hasholme (SE 8232), Arglam (SE 7836) and Stray Farm (SE 7836). Halkon (1987) discussed the effects of this on spatial coverage across the block for the photographs he studied. Though the total number of photographs available for plotting has increased since Halkon's survey, the more obvious biases in the distribution are still equally apparent today (Illus. 2.1). The major gaps lie in the south-west quarter of the area to the south of the Foulness and along the western edge of the survey block. This may be due to the lack of systematic reconnaissance of the area but work targeted on these areas in 1986 (Halkon 1987) failed to identify any soil or cropmarks, thus confirming Riley's impression that nothing was visible when he flew the area (1977, 28). In part this gap in the photographic record is likely to result from a genuine lack of cropmarks. This does not preclude the existence of settlements, but suggests that any archaeological structures do not appear as soil or cropmarks.

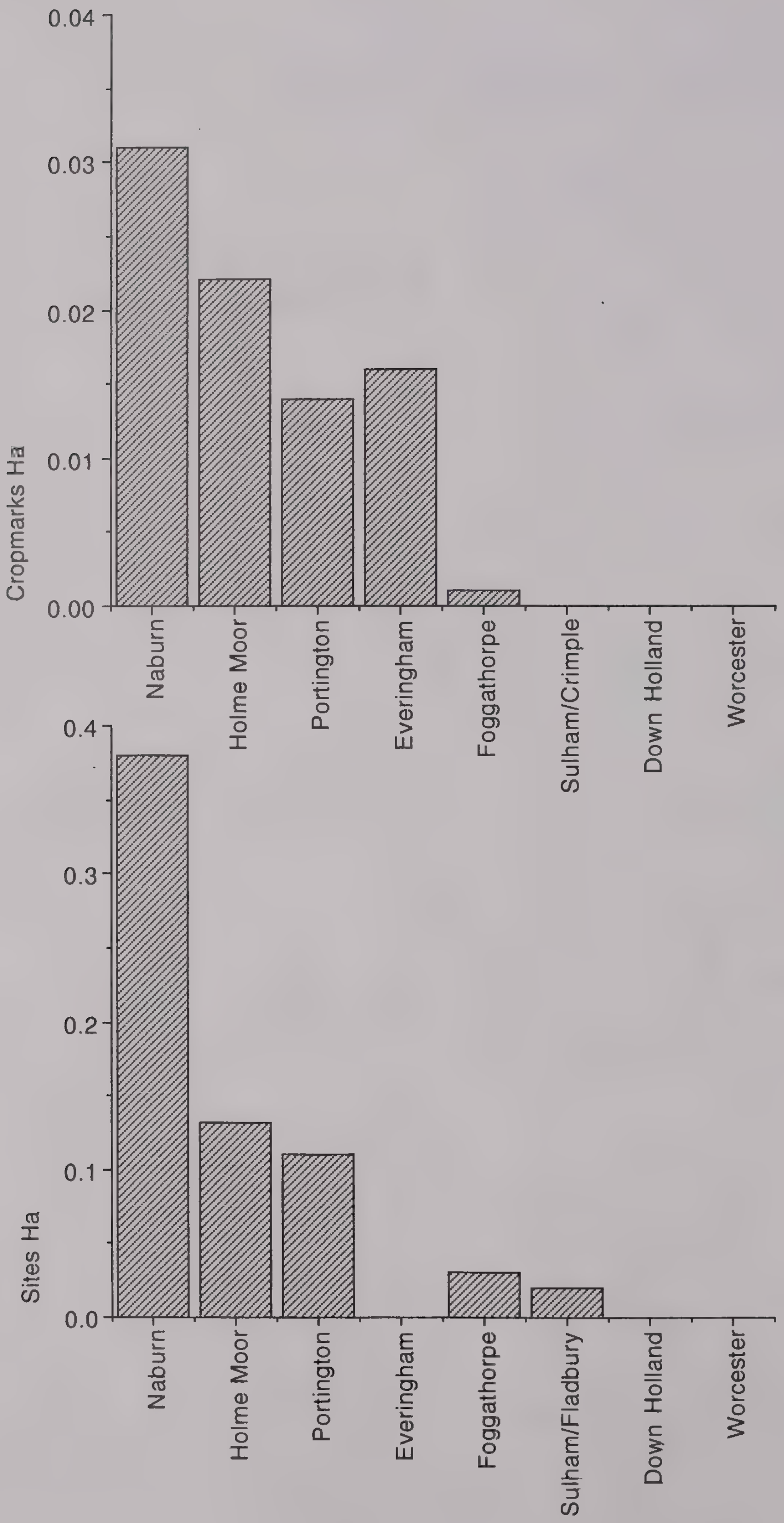
Extensive systematic work by the Soil Survey of England and Wales during the 1970s and 1980s, has improved our understanding of which crop types and soil associations tend to form cropmarks and the relative frequency of their occurrence (Evans 1972; 1980; Evans and Carroll 1976; Evans and Catt 1987). This knowledge allows us to start mapping localities where cropmarks are likely to occur within a particular region, but does not allow us to determine whether cropmarks will occur in specific locations because of localized variations in soil and crop types, and especially drainage, caused by differences in soil depth and local topography. This exercise thus provides a qualitative appraisal of the main biases in the survey area as a whole.

A study of the incidence of cropmarks on the major soil associations suggests that in the Holme survey block soil conditions are a significant determinant of cropmarks distribution. The area covered by each of the soil associations has been noted above (Table 1.1). Illus 2.2A shows the total frequency of cropmarks per hectare for each soil type and clearly reveals a scarcity of marks on Down Holland peat, Sulham/Fladbury alluvial, Worcester Mercia Mudstone and Foggathorpe Clay soil series. This scarcity of cropmarks does not appear related to modern agricultural practice, as current arable cultivation evenly incorporates virtually all the soil types of the area. Field-walking has similarly covered a proportional amount of each soil type (below Chapter 2.3). The pattern of cropmark distribution compares well with Riley's results on similar soils in the Doncaster area (Riley 1980, 59), where cropmarks rarely occur away from the main sandy soils.

As cropmarks only appear frequently on sandy soils in the Holme area, it is important to consider whether they are a reliable reflection of past settlement and land use, by making a comparison with the field-walked evidence where coverage was more consistent (below Chapter 2.3). The distribution of pottery scatters recorded during field-walking shows the same marked preference for the drier sandy soils (Illus. 2.2A and B). The absence of field-walked pottery from the Everingham sands may be due to the small area walked (26.3ha) or the ease with which Everingham sands are wind blown, thus obscuring surface visibility. The absence of occupation indicators on the Worcester Mercia Mudstone and the Down Holland peat is not surprising but the presence of finds from the Sulham/Fladbury series suggests that earlier occupation is blanketed in places by the alluvium preventing the development of cropmarks and possibly masking activity in the immediate vicinity of the Foulness creek system.



Illus. 2.1 *Distribution of cropmark sites in the Holme landscape block. Numbers refer to the Gazetteer (below Section 2.3.3). Note this distribution includes evidence of all periods*



Illus. 2.2 *A. Relationship between density of cropmark sites per ha and soil types in the Holme landscape block*
B. Relationship between density of field-walked sites per ha and soil types in the Holme landscape block
Sands - Naburn, Holme Moor, Portington and Everingham series; Clay -Foggathorpe series;
Peat - Down Holland series; Alluvium -Sulham/Fladbury series; Mudstone - Mercia series

2.2.1 The Holme-on-Spalding Moor plots

The maps used in the following commentary were compiled on the basis of information provided by the RCHME Air Photographic Unit and initially plotted at 1:10,560 scale[1]. For ease of publication and in order to maintain some of their wider context, the plots are produced as 1.5 by 2.5km blocks (areas A-J Illus. 2.4-2.13) which can be related to one another using the key (Illus. 2.3). Subsequently, a number of cropmark complexes in the Hasholme-Bursea area were replotted at 1:2,500 scale for detailed evaluation and, where helpful, were reproduced at 1:5,000 (Brown 1992). The increased focus on this area close to the majority of excavations discussed in this volume was useful as the soils were known to have produced a good range of cropmarks.

For the purposes of discussion the ten 1:10,560 plots can be considered to cover two geographical areas; Illus. 2.4-2.8 (areas A-E) incorporating Church Hill and the village of Holme-on-Spalding Moor, and Illus. 2.9-2.13 (areas F-J) cover the middle and lower reaches of the Foulness and its tributary streams. Though the division of these blocks is somewhat arbitrary, there are aspects of their topography, soils and drainage which differ significantly.

The Church Hill area (areas A-E; Illus. 2.4-2.8)

The five maps illustrated largely coincide with the broad expanse of aeolian and glacio-fluvial sands that dominates the north and east of the survey area. The aeolian ridges here rise above 8m O.D. for much of the area around Church Hill, the main topographical feature in the landscape at 46m O.D. The edges of the Mercia Mudstone outcrop from which the hill is formed broadly coincide with the 15m contour shown on the maps. Much of the land covered by Illus. 2.4, 2.6 and 2.7 (areas A, C and D) would have been less susceptible to seasonal or occasional flooding when compared with the survey area as a whole. The variations in detailed microtopography of the lower lying areas shown in parts of Illus. 2. 5, 2.7 and 2. 8 (areas B, D and E and the Foulness areas F-J) could have placed major constraints on the location of particular activities. Unfortunately it is impossible to represent here the many topographical details and complex changing effects of now relict water courses. Only where particular relationships can be easily demonstrated are they illustrated.

The Foulness area (areas F-J; Illus. 2.9-2.13)

Here, the survey covered the river from its junction with the Walling Fen, along its lower reaches, as far as its curve northwards near Arglam (SE 7835). The maps focus predominantly on the northern side of the river and its creek system where much of the ground work of the Holme survey was based. The southern side of the river is mostly formed by Foggathorpe clays which were unresponsive to cropmark formation.

Topographically this block of land resembles much of the Church Hill area with frequent ridges of aeolian sands, but the elevation is significantly lower at around 2-4m O.D. to the east and 3-5m to the west. This area would therefore have been more susceptible to flooding before modern drainage and many low lying zones are covered by alluvium and pockets of peat. Subtle changes in microtopography are thus of particular significance for settlement location. Some attempt to indicate this on the maps is given by plotting known spreads of alluvium and peat. This has the additional advantage of showing areas where some archaeological features may be obscured by blanketing deposits. As it is not possible to closely date much of the alluvium, the distributions on the maps should not be taken to represent contemporary areas of flooding. They do, however, provide a useful guide to areas likely to have been marginal and prone to waterlogging or occasional inundation during the Iron Age and Romano-British periods.

A second difference from the Church Hill area is the presence of a number of patches of Foggathorpe clay soils in parts of blocks F and G (Illus. 2.9 and 2.10). These may have had a bearing on the location of settlement but the clear negative effect such soils have on cropmark formation produces blanks on the air photographic maps that may be more apparent than real.

2.2.2 Discussion

The intention here is not to give a detailed description of all the cropmarks plotted on Illus. 2.4-2.13, but simply to discuss a range of points that arose from studying them in the context of the broader aims of the survey (cf. Chapter 1). There are, however, four key issues that should be discussed before any attempt at an interpretation of the wider Iron Age and Romano-British landscape of the Holme-on-Spalding Moor region: distribution, structural relationships, geographical context and chronology.

Distribution

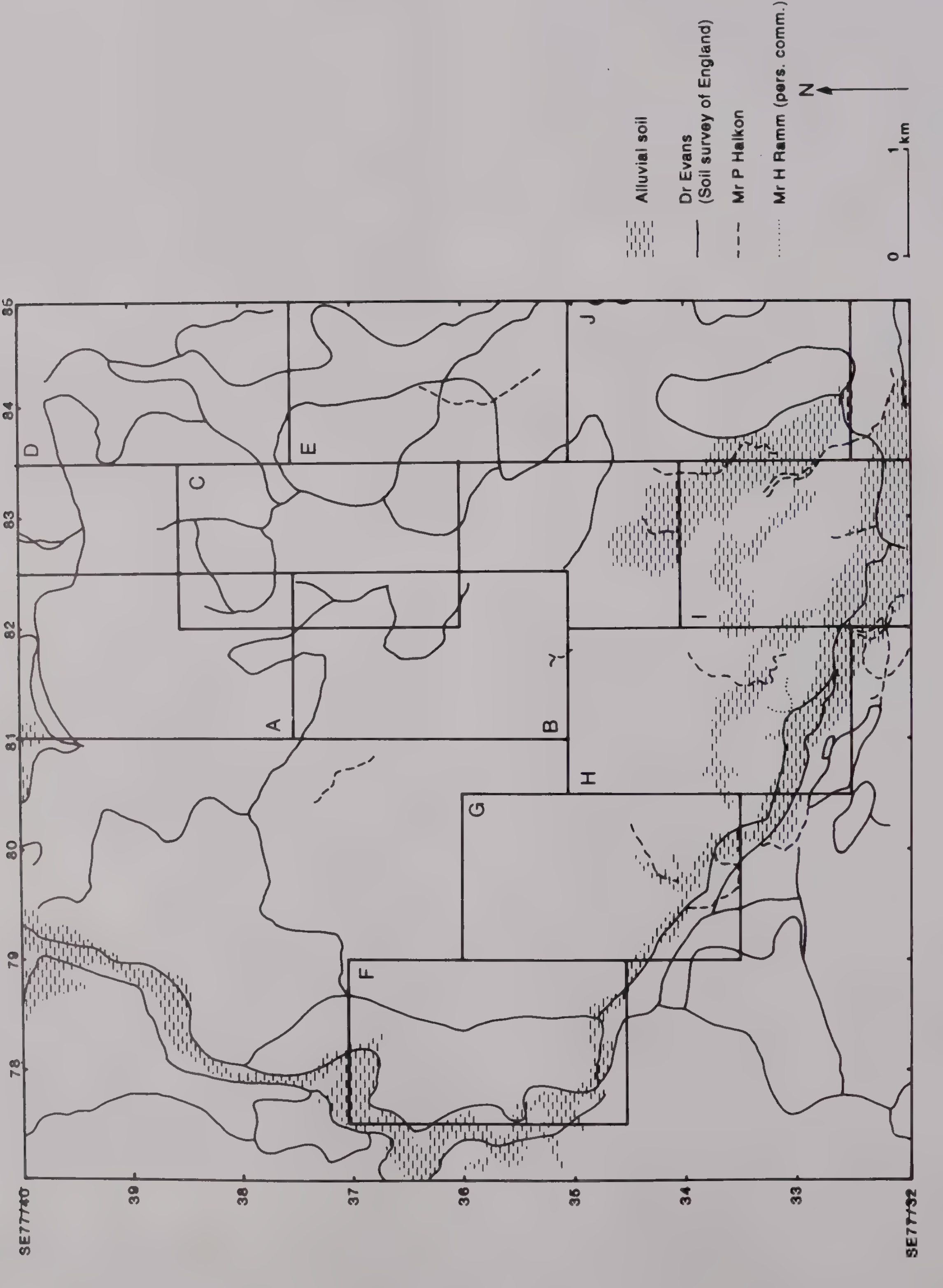
Although the aeolian sands frequently develop archaeological cropmarks they do not do so over large areas. This is probably due to complex changes in subsurface drainage over short distances in such soils rather than necessarily being a genuine reflection of the distribution of past landscape features, especially as marks of geological origin are similarly intermittent (further examples of this can be seen in Evans 1990). Cropmark evidence for activity is therefore patchy even on the sandy soils indicating that the absence of marks cannot

Footnote:

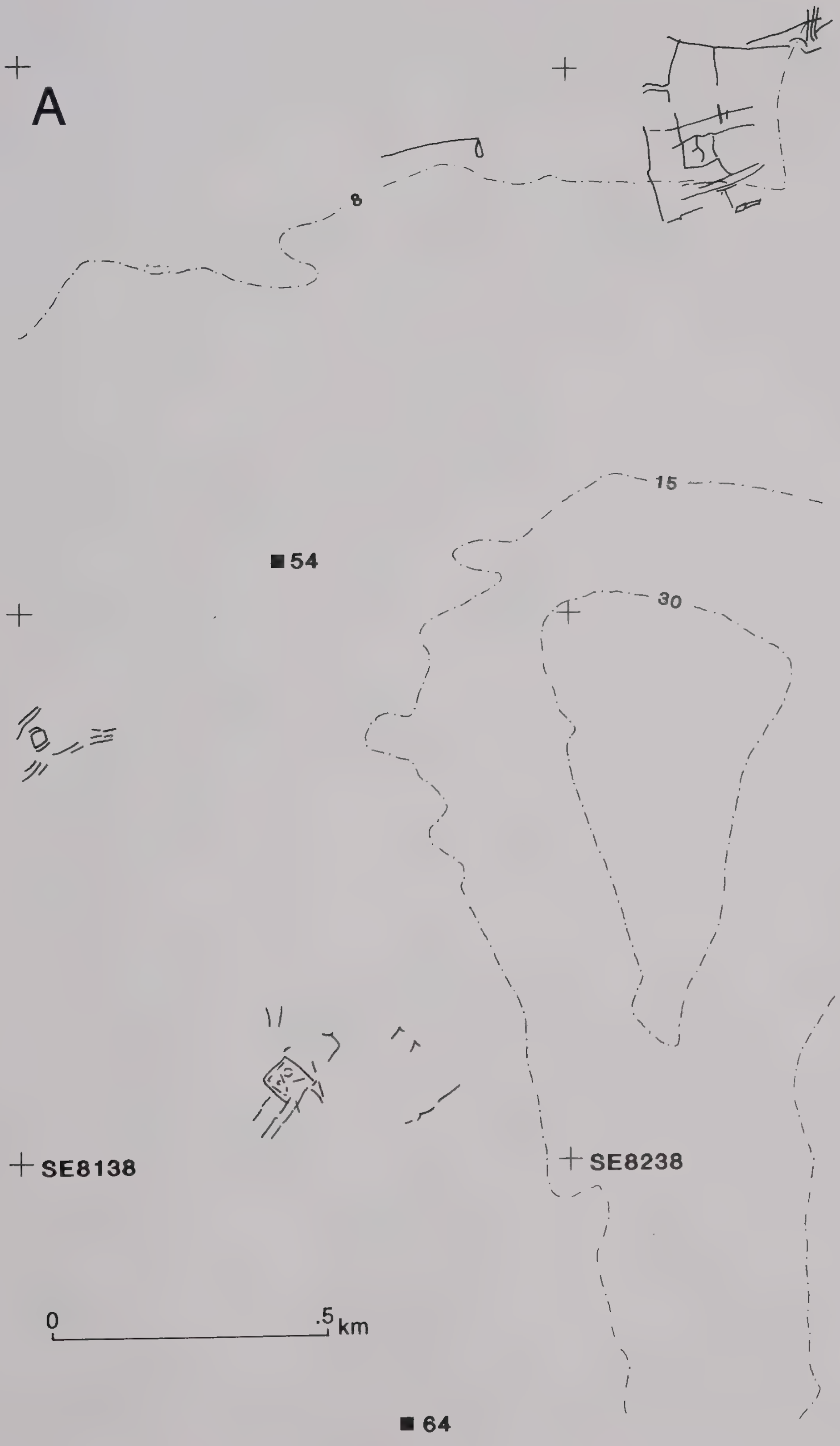
[1] The 1:10,560 plots were produced by Danny Ferguson from the Dept of Archaeology at Durham University whilst on a placement at the York Office of the RCHME.

necessarily be equated with the absence of settlement. Further support for this is perhaps provided by the fact that only twenty-eight of ninety-seven Iron Age and Romano-British artefact scatters recovered from the sandy soils lie over or within 50m of cropmarks and soil marks. It should be noted that the scatters may relate to activities that took place predominantly on or above the ground surface leaving none of the significant subsurface features that tend to cause cropmarks.

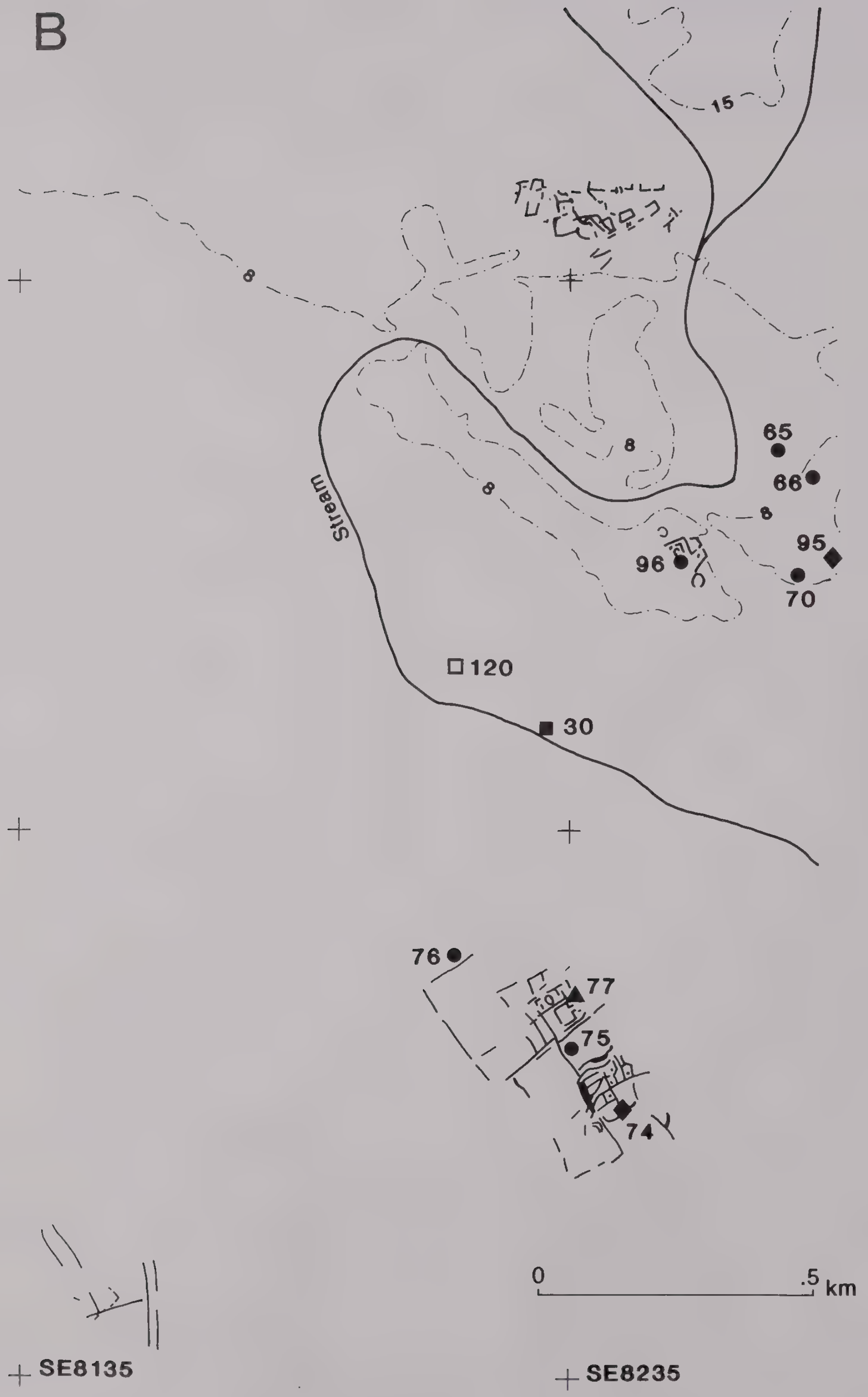
It is also important to note that the Holme air photographic record is biased towards certain types of infor-



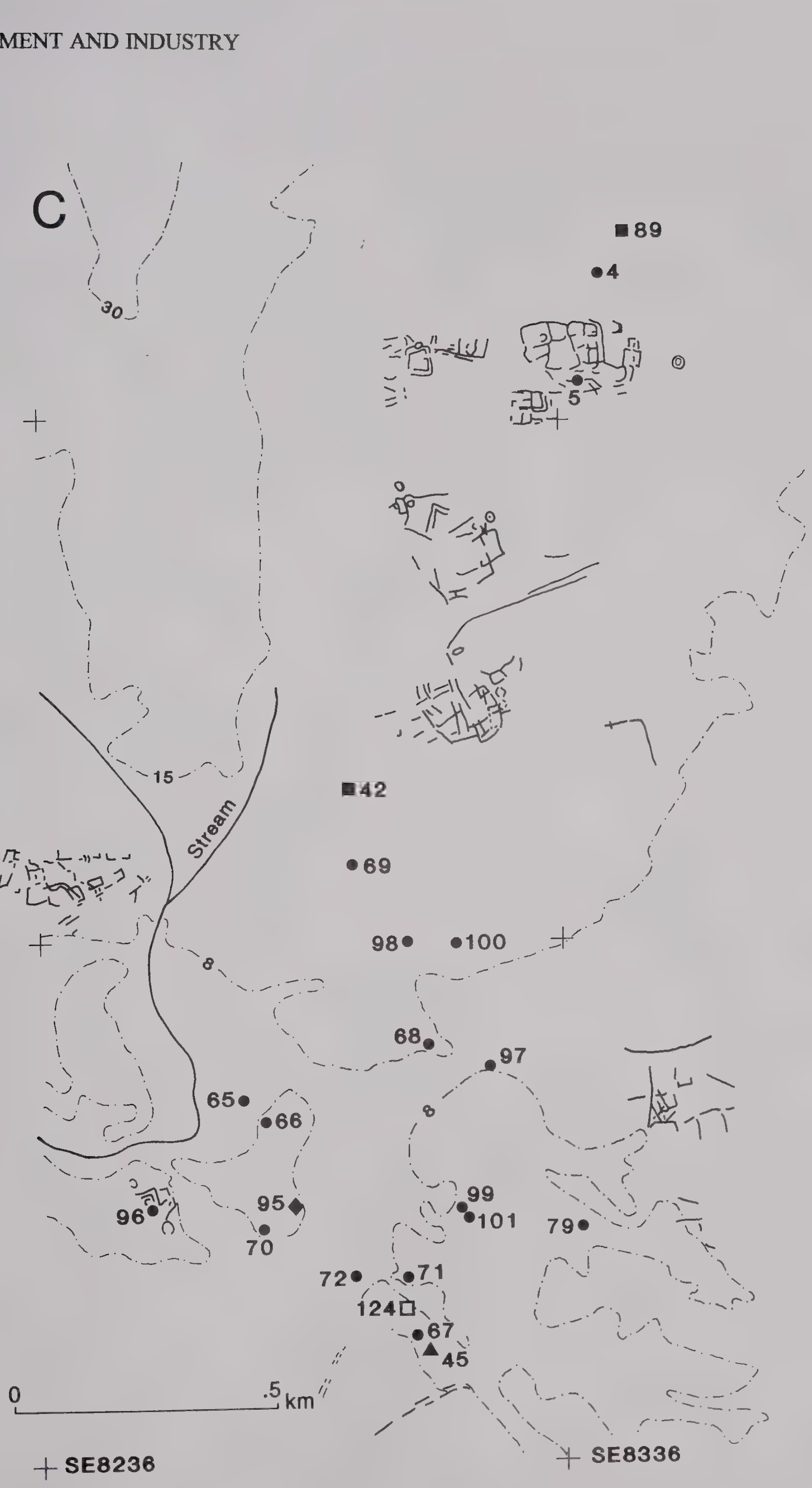
Illus. 2.3 *Map of the Holme landscape block providing the key to the location of the detailed air photographic plots (Illus. 2.4 - 2.13)*



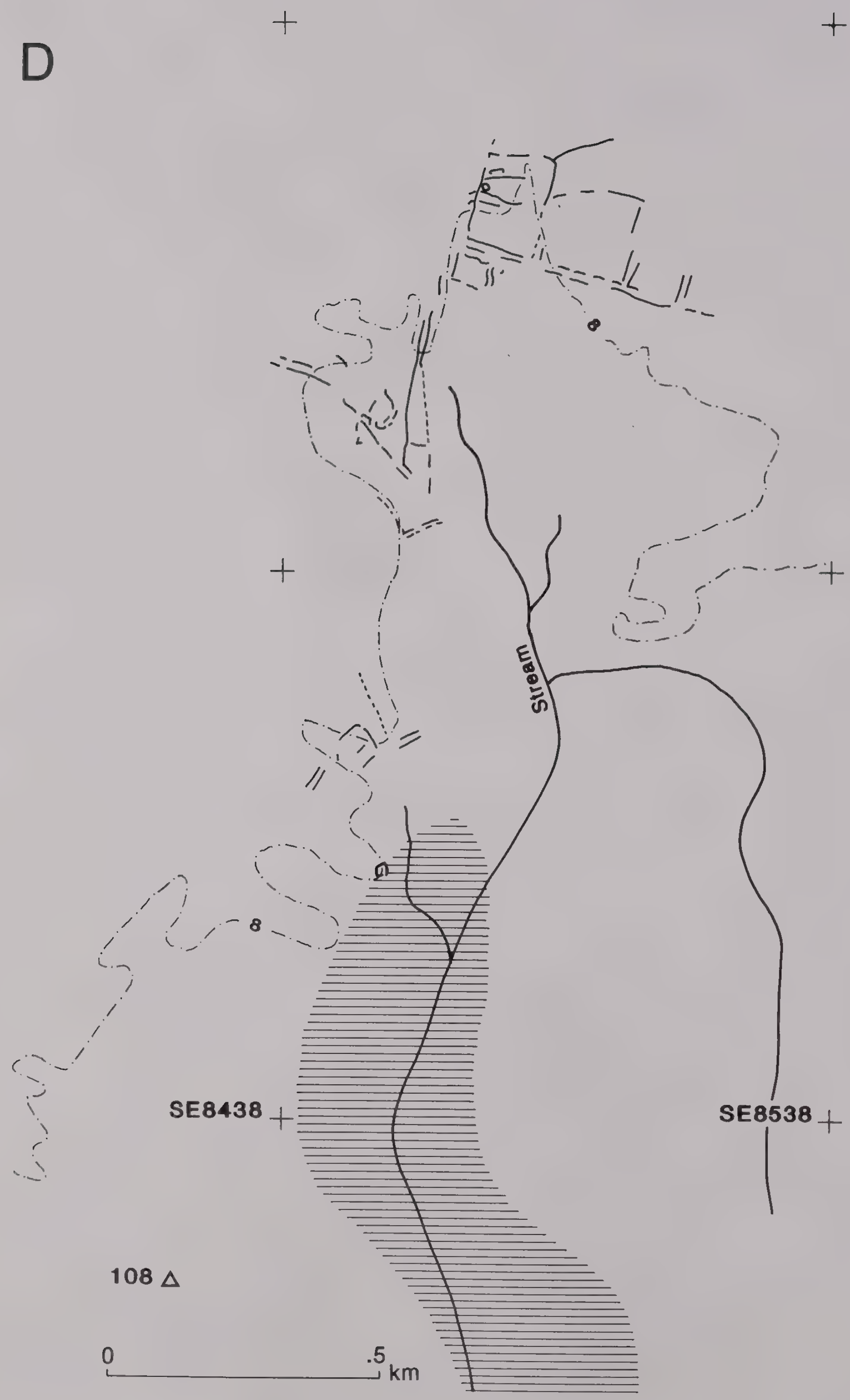
Illus. 2.4 *Plot of the aerial photographic evidence from area A in relation to the sites located by field-walking. Medieval and later features are omitted. For location see Illus. 2.3. Numbers refer to the Gazetteer, locations are classified as follows: solid square - settlement; spot -pottery scatter/possible settlement.(Aerial photographic plots compiled on the basis of information provided by RCHME)*



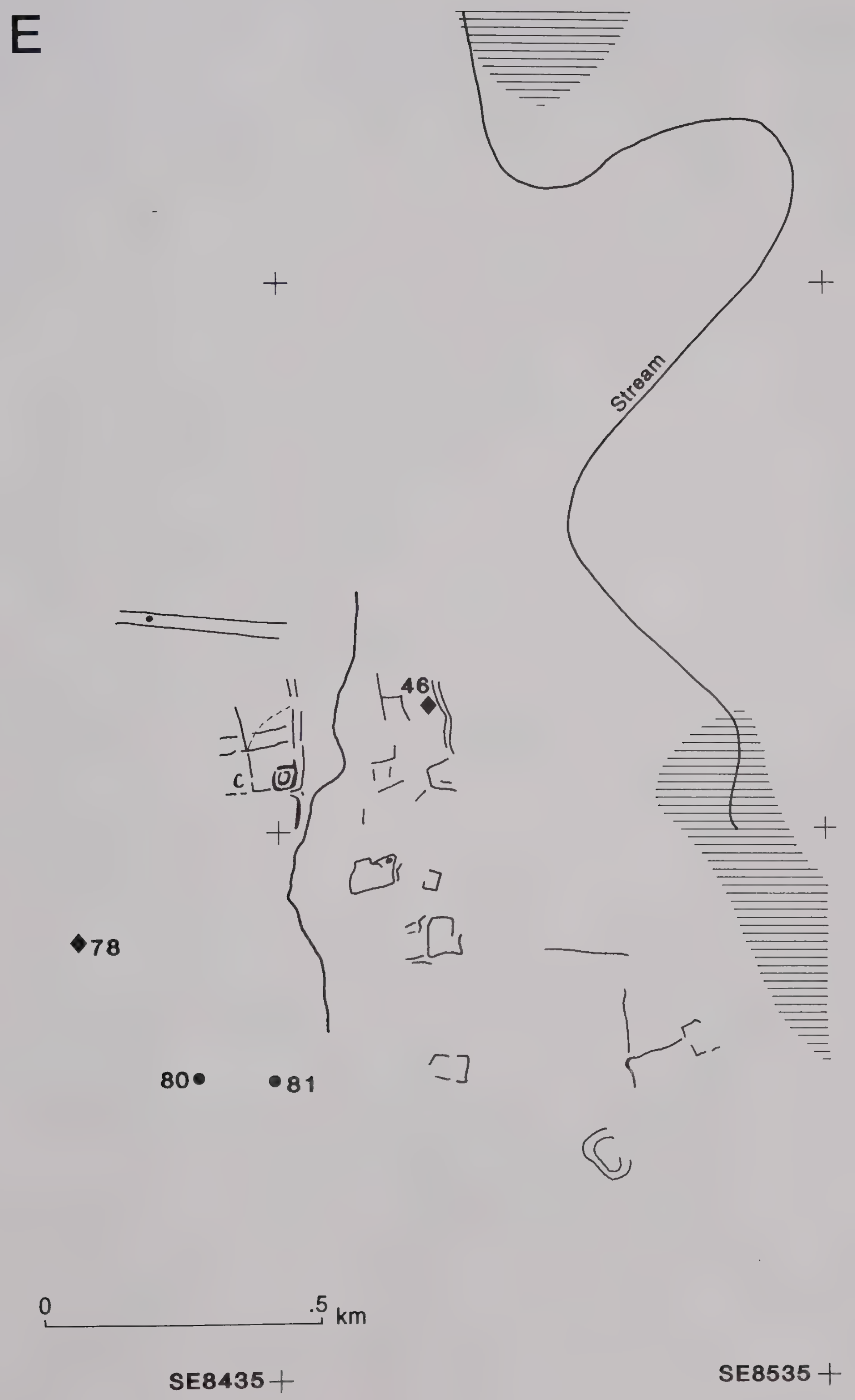
Illus. 2.5 *Plot of the aerial photographic evidence from area B in relation to the sites located by field-walking. Medieval and later features are omitted. For location see Illus. 2.3. Numbers refer to the Gazetteer, locations are classified as follows: triangle - kilns; lozenge - kilns; solid square - settlement; spot - pottery scatter/possible settlement. (Aerial photographic plots compiled on the basis of information provided by RCHME)*



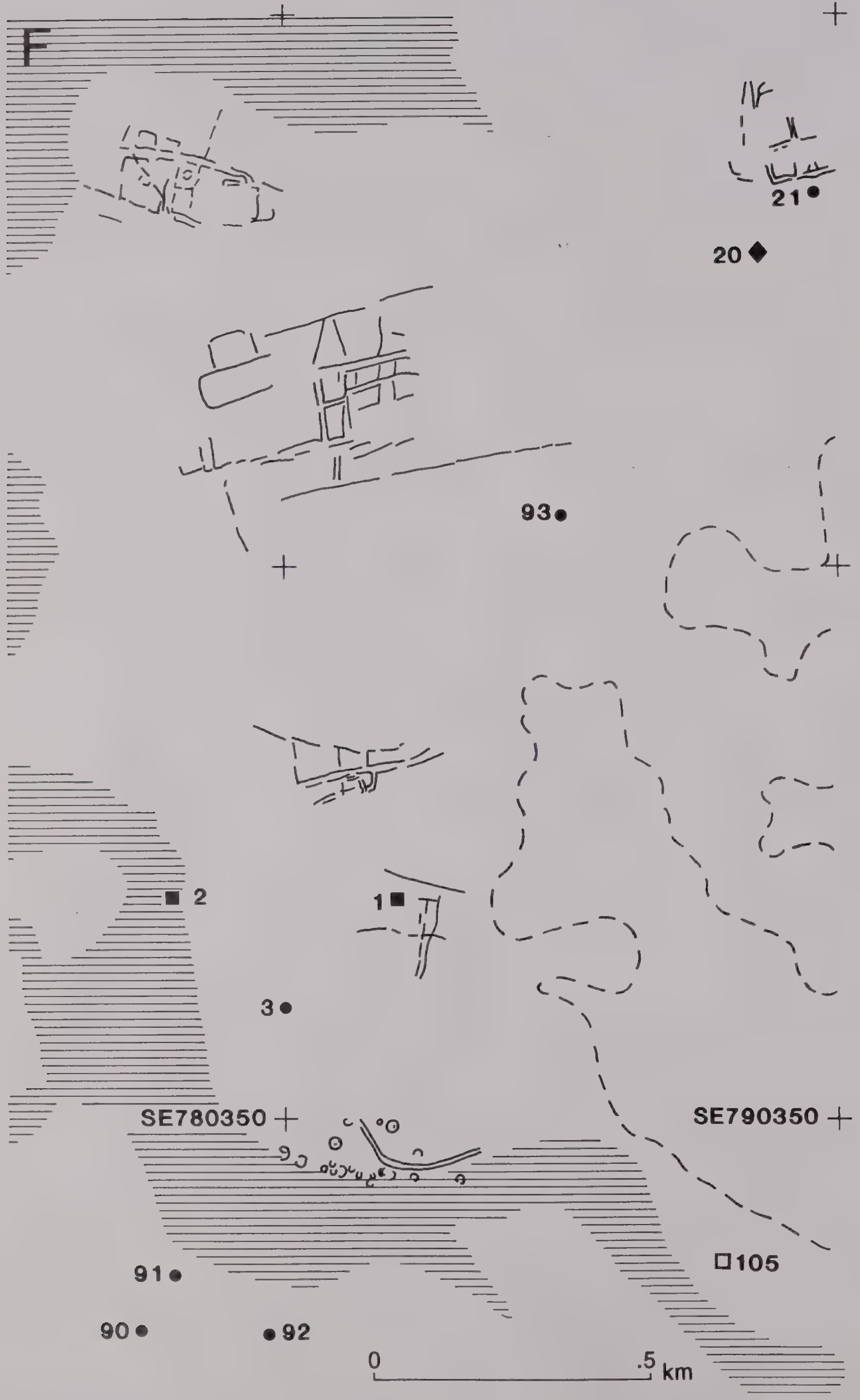
Illus. 2.6 *Plot of the aerial photographic evidence from area C in relation to the sites located by field-walking. Medieval and later features are omitted. For location see Illus. 2.3. Numbers refer to the Gazetteer, locations are classified as follows: triangle - kilns; lozenge - kilns; solid square - settlement; open square - slag concentration; spot - pottery scatter/possible settlement. (Aerial photographic plots compiled on the basis of information provided by RCHME)*



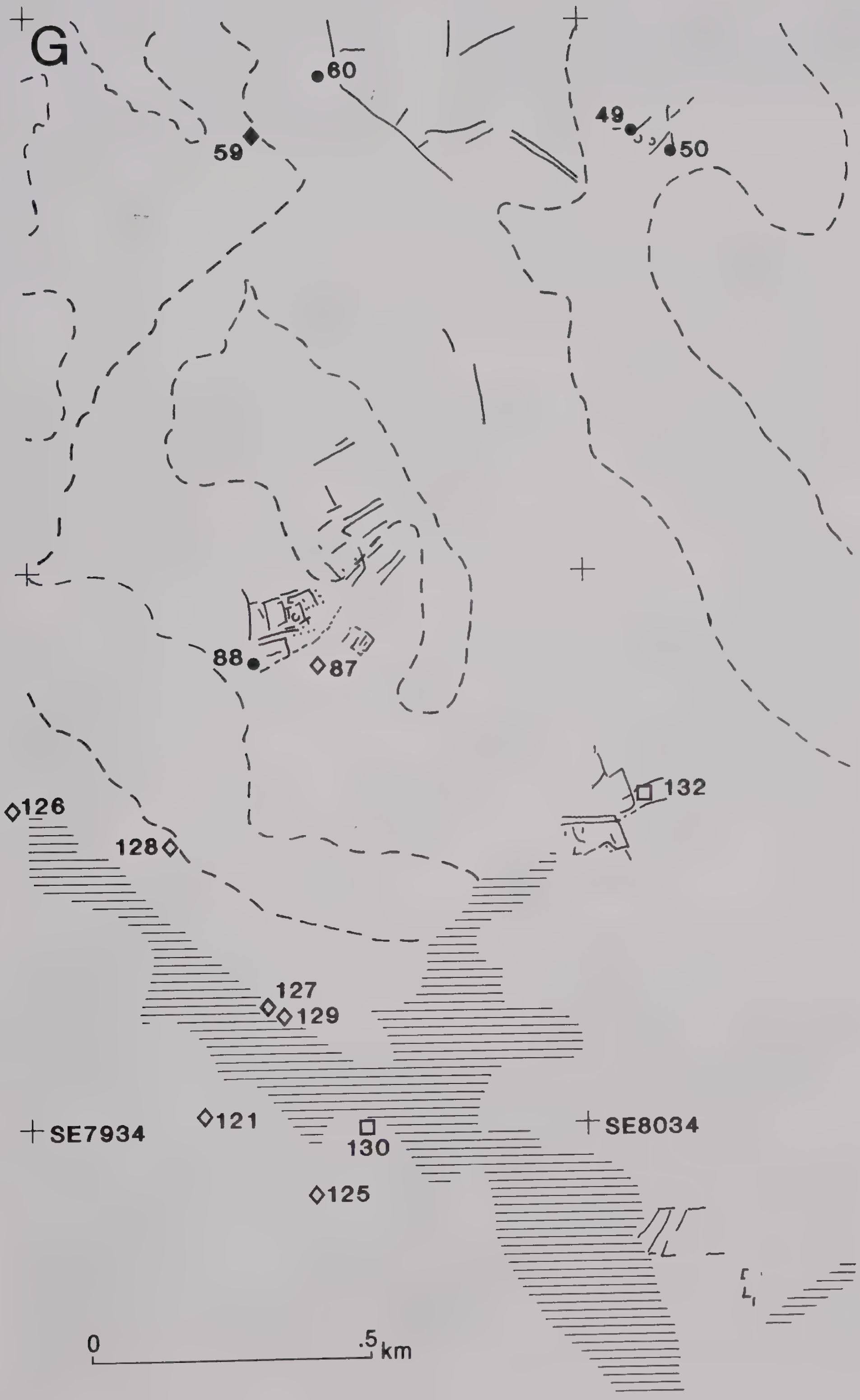
Illus. 2.7 *Plot of the aerial photographic evidence from area D in relation to the sites located by field-walking. Medieval and later features are omitted. For location see Illus. 2.3. Shading represents areas of peat and alluvium. Numbers refer to the Gazetteer, locations are classified as follows: triangle - kilns. (Aerial photographic plots compiled on the basis of information provided by RCHME)*



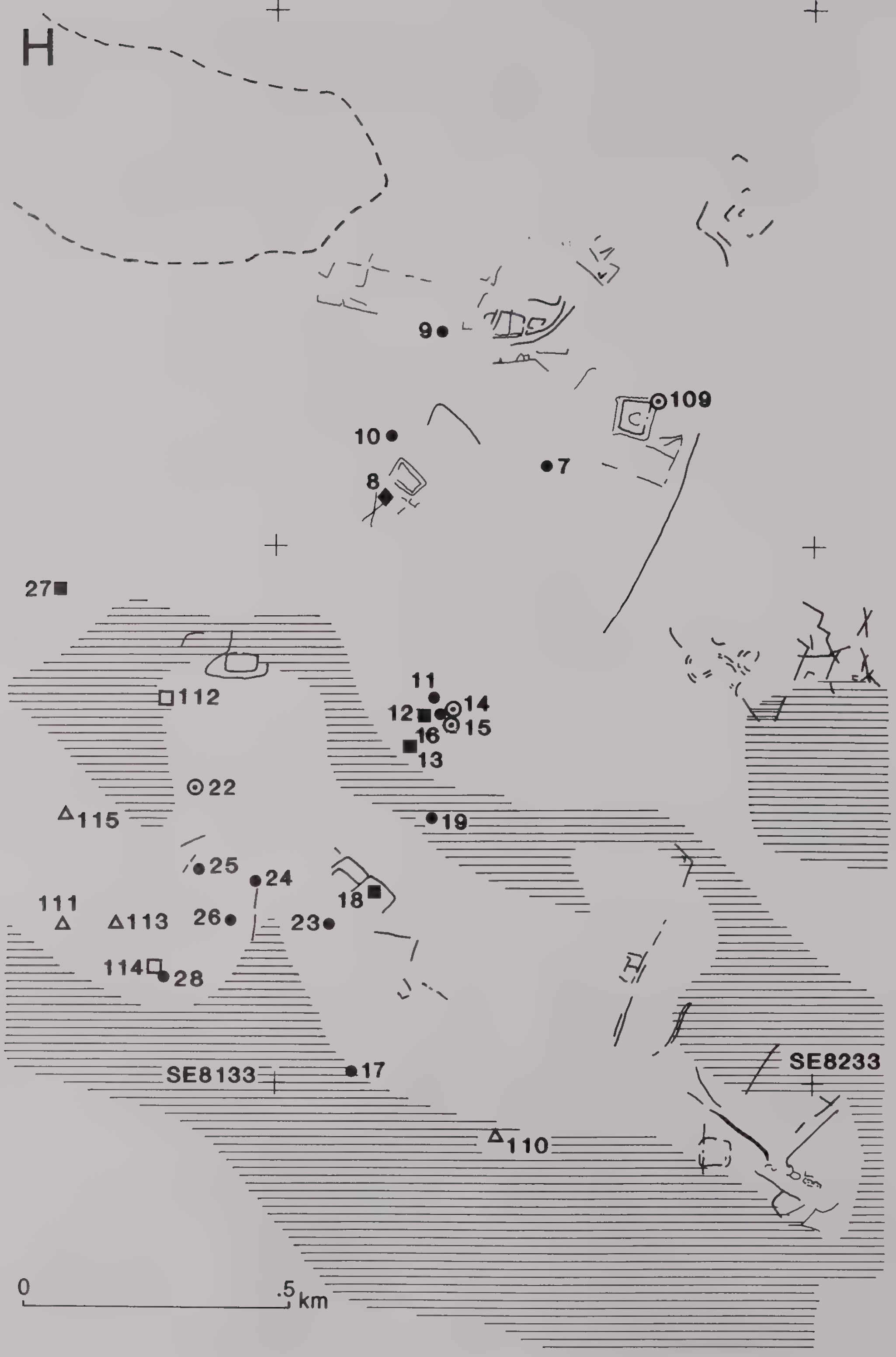
Illus. 2.8 *Plot of the aerial photographic evidence from area E in relation to the sites located by field-walking. Medieval and later features are omitted. For location see Illus. 2.3. Shading represents areas of peat and alluvium. Numbers refer to the Gazetteer, locations are classified as follows: lozenge - kilns; spot - pottery scatter/possible settlement. (Aerial photographic plots compiled on the basis of information provided by RCHME)*



Illus. 2.9 *Plot of the aerial photographic evidence from area F in relation to the sites located by field-walking. Medieval and later features are omitted. For location see Illus. 2.3. Shading represents areas of peat and alluvium. Numbers refer to the Gazetteer, locations are classified as follows: lozenge - kilns; solid square - settlement; open square - slag concentration; spot - pottery scatter/possible settlement. (Aerial photographic plots compiled on the basis of information provided by RCHME)*

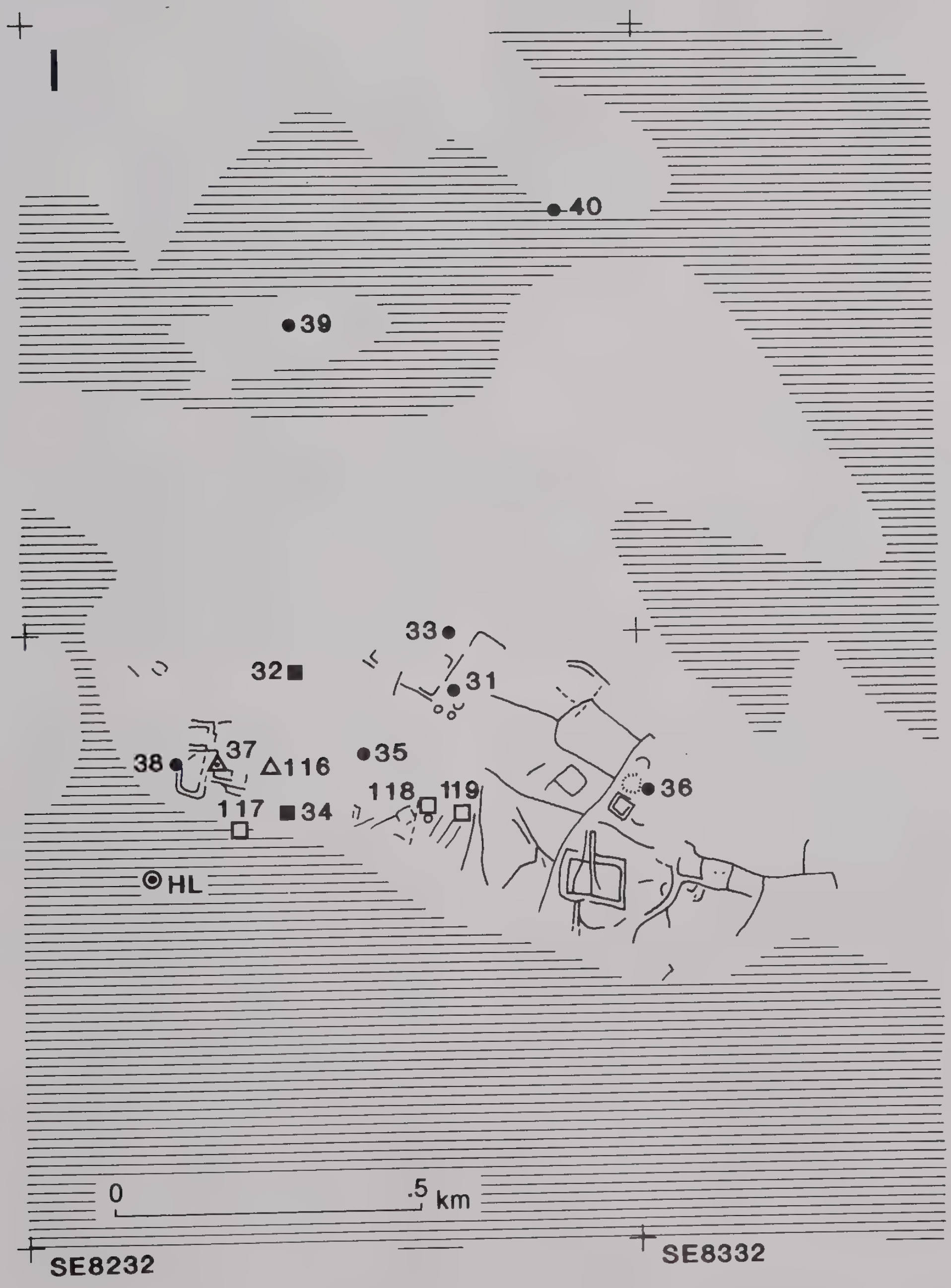


Illus. 2.10 *Plot of the aerial photographic evidence from area G in relation to the sites located by field-walking. Medieval and later features are omitted. For location see Illus. 2.3. Shading represents areas of peat and alluvium. Numbers refer to the Gazetteer, locations are classified as follows: lozenge - kilns; solid square - settlement; open square - slag concentration; spot - pottery scatter/possible settlement. (Aerial photographic plots compiled on the basis of information provided by RCHME)*

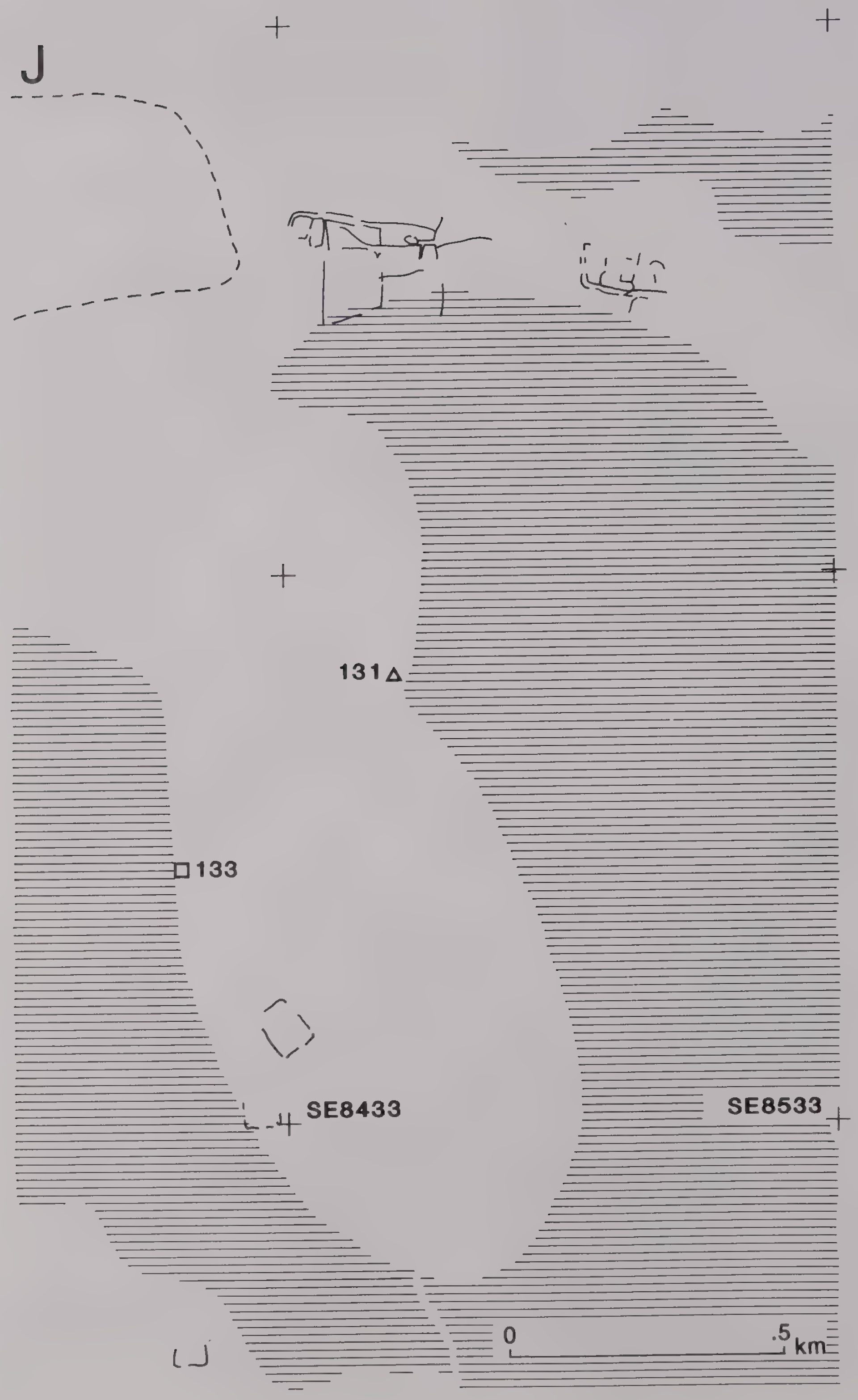


Illus. 2.11 *Plot of the aerial photographic evidence from area H in relation to the sites located by field-walking. Medieval and later features are omitted. For location see Illus. 2.3. Shading represents areas of peat and alluvium. Numbers refer to the Gazetteer, locations are classified as follows: triangle - kilns; lozenge - kilns; solid square -settlement; open square - slag concentration; spot - pottery scatter/possible settlement. (Aerial photographic plots compiled on the basis of information provided by RCHME)*

mation, in particular the construction of linear features. Inevitably the air photographic plots show a landscape of pits or other holes, enclosures, linear boundaries and defined pathways, thus tending to focus the attention of the interpreter upon them. In the following commentary an attempt is made to analyze these features as parts of a wider landscape by integrating other information. Partly for this reason and partly through limitations of time and space I have not produced a detailed morphological classification of the cropmarks here but instead concentrate on a more synthetic description of the air photographic record.



Illus. 2.12 *Plot of the aerial photographic evidence from area I in relation to the sites located by field-walking. Medieval and later features are omitted. For location see Illus. 2.3. Shading represents areas of peat and alluvium. Numbers refer to the Gazetteer, locations are classified as follows: triangle - kilns; solid square - settlement; open square - slag concentration; spot - pottery scatter/possible settlement. HL = Hasholme logboat. (Aerial photographic plots compiled on the basis of information provided by RCHME)*



Illus. 2.13 *Plot of the aerial photographic evidence from area J in relation to the sites located by field-walking. Medieval and later features are omitted. For location see Illus. 2.3. Shading represents areas of peat and alluvium. Numbers refer to the Gazetteer, locations are classified as follows: triangle - kilns; open square - slag concentration. (Aerial photographic plots compiled on the basis of information provided by RCHME)*

Structural relationships

In this section the spatial association of one cropmark with another is investigated through the study of their elementary structural relationships (E.S.Rs) in order to help to analyze the principal kinds of chronological relationship between features. The four main types of relationship that can be inferred from air photographs are *superimposition* (one feature appears to lie above or below another), *conjunction* (an element is annexed to another pre-existing one), *clustering* (discrete features appear grouped adjacent to another), and *alignment* (elements seem to be parallel, near parallel or in line with each other). Superimposition indicates that two features were constructed at different dates and seemingly without regard to one other (though it is very rarely possible to identify which is earlier). Conjunction, and to a lesser degree alignment and clustering, imply that features were constructed with regard to one another. This does not suggest that they were necessarily contemporaneous or near contemporaneous but that there may be continuity of structure (if not usage and meaning) in the landscape.

Applying these principles of E.S.R. to the Holme survey plots suggested that two interlinked trends could be studied. The first was the evidence for phasing or relative chronology; the second for spatial continuity and discontinuity. Phasing of cropmark sites is suggested by superimposition and conjunction. Spatial continuity by conjunction, alignment and clustering; discontinuity by superimposition and possibly isolation.

An obvious feature of the Holme area cropmarks is that where evidence is more than fragmentary examples of isolated or single enclosures are relatively rare. The majority of cropmarks on the sands in particular consist of agglomerations of enclosures frequently linked to droveways. Exceptions tend to consist of small (*c.* 0.04ha) rectilinear enclosures either alone or in clusters (eg. Illus. 2.14 nos. 2 and 3), single ovoid enclosures (eg. Illus. 2.14 no. 20), and distinctive medium (*c.* 0.15ha) to large (*c.* 0.27ha) rectilinear double-ditched enclosures (eg. Illus. 2.14 nos. 17 and 19). Each of these is discussed further below (Chapter 2.3), here it is important to note that most of the rectilinear forms also appear as parts of multiphase aggregated complexes, the few ovoid examples do not. Generally the cropmark evidence gives an impression of the quite intensive and/or long term working of particular sections of the landscape, if not necessarily of the area as a whole.

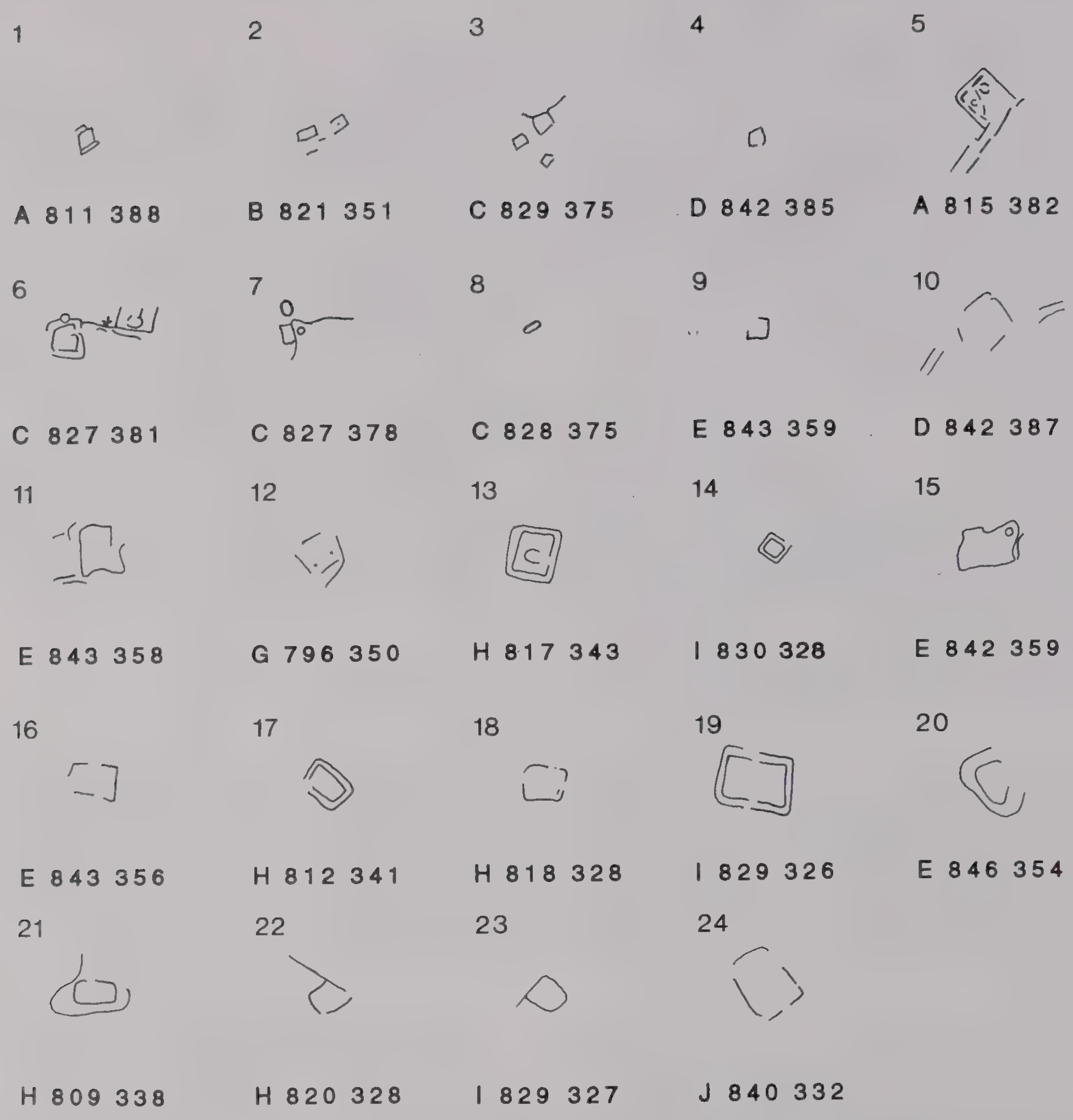
There is little evidence of systematic synchronic development like the brickwork plan fields discussed by Riley (1980) though two possible examples exist in areas D (SE 845397) and E (SE 840351). The majority of the complexes appear to have formed through the aggregation of features to pre-existing enclosures (eg. area C, SE 831381) or double ditched linears (eg. area H, SE 815344). This suggests a marked degree of continuity of structure in the landscape, with examples of large scale realignments rare (though see below Chapter 2.3). This may possibly be a result of a process of adaptation during the period under review but it is important to be wary of making assumptions about linking continuity of landscape features with continuity of use or occupation (see above). Though superimposition (discontinuity) of cropmarks is common it is usually apparent as relatively small scale restructuring, or as isolated examples on the higher drier soils to the north of the survey area (Illus. 2.4-2.8) and further upstream along the Foulness (Illus. 2.9 and 2.10). In the more marginal lower lying areas around the Foulness in the south-east of the area there is abundant evidence for quite considerable restructuring of landscape features (areas F and G). It is likely that this is a result of the complex, changing nature of the drainage channels and its susceptibility to inundation rather than a fundamental shift in the nature of settlement itself as all the elements visible in the complex around Bursea (area I, SE 823327-830336) are repeated elsewhere in the study area.

Geographical context

There are a plethora of possible geographical details that could be studied in connection with the location and distribution of the cropmarks but I have chosen here to concentrate on topography, soils, and drainage. The seeming preference for siting on sandy ridges has already been mentioned and is discussed in Section 2.3.4 but there are a series of further significant details that can be inferred about the link between the constructed and physical features of the landscape.

The microtopography of the area as it appears today is frequently ignored or easily missed but experience from this survey and other regions such as the East Anglian Fens suggested that even relatively small changes in topography and elevation could have been important in the choice of location and form for settlement. In the Holme area there seem to be two trends in particular. First, in most cases the principal axes of a complex follow the local microtopography (though this is frequently impossible to show on the illustrated plans), being orientated along the line of the main contour or towards the nearest watercourse (eg. Illus. 2.15 nos. 29 and 33). This pattern of localized topophilia produces a patchwork effect in the distribution of cropmarks at a larger scale where individual complexes do not appear to be aligned with any wider system of land use or communication. Again this issue is discussed further below (Sections 2.2.3 and 2.2.4) but a striking example of this is provided by Illus. 2.9. Here, two clearly visible complexes at SE 778367 and SE 781363 appear to have developed completely independently of one another despite being less than 400 m apart (though admittedly they may date to separate periods).

Second, in lower lying areas the principal agglomerations of enclosures appear to be separated by perimeter earthworks (often in the form of possible double-ditched trackways) from areas in the immediate vicinity of the main watercourses where marks are largely absent (eg. areas



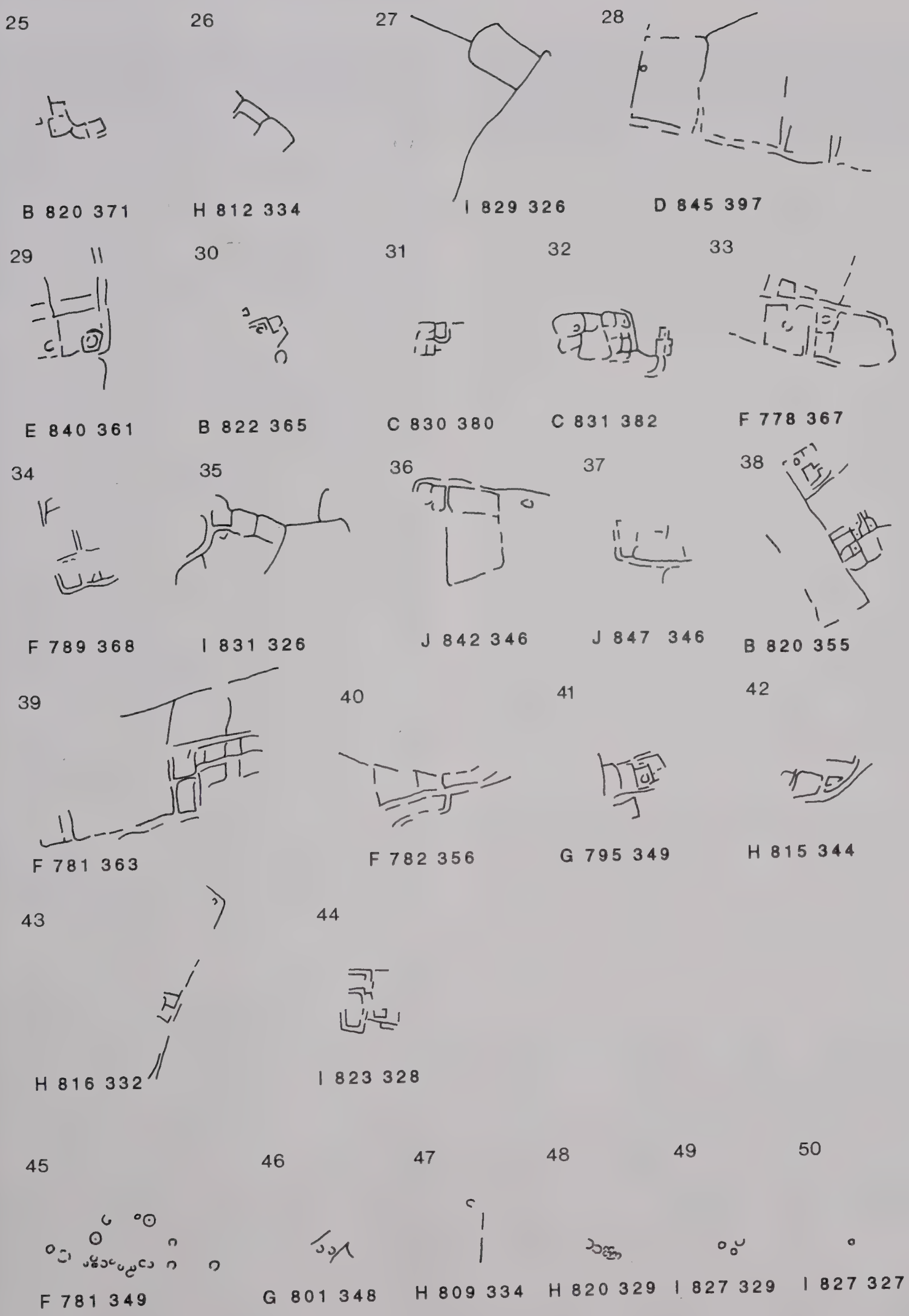
Illus. 2.14 *Cropmark sites from the Holme landscape block: rectangular and ovoid enclosures. Scale 1:10,560*

E, SE 840361 and J, SE 841346). Though it is quite possible that cropmarks simply fail to form in these low lying areas (which are sometimes partially covered with alluvium) the impression is that the earthworks divide the main area of occupation from more open possible wetland areas along the floodplain of the Foulness and the edge of Walling Fen.

Chronology

This study centres on Iron Age and Romano-British settlement and as such crop and soil mark features obviously not of this date (such as ridge and furrow) have been omitted from the plots. Many of the more fragmentary marks in particular are ambiguous in date and association and may not relate to the study period. Although this could also be true of the more complete or recognizable complexes excavation suggests that they are likely to be of Iron Age and Romano-British date (cf. Chapters 3-5). Many of the cropmark complexes do have Iron Age and/or Roman assemblages recorded from field-walking but the general absence of later Bronze Age and early Medieval material from the region cautions against assigning dates to the cropmarks from artefacts overlying them. Equally, there is a bias towards Roman dating because plentiful, highly robust and easily identifiable Roman pottery contrast with the rarer, less diagnostic and more friable Iron Age fabrics. Ploughsoil artefact scatters represent an aggregate of a complex range of depositional activities from the whole history of a particular area (see Haselgrove 1985). Therefore they may relate to past activity on or near the surface that was not related to the surviving structural features. With this in mind no attempt has been made to tie cropmarks to a narrower period unless there is good stratified evidence for a more restricted period of use. There have been few excavations in the survey area and these are discussed elsewhere in this volume. Here I would like to briefly discuss their possible significance for dating features illustrated on the maps both directly and through morphological analogy.

The only excavated aerial photographic sites within the study area are a single enclosure at Bursea Grange (below Chapter 3) and a series of multiple enclosures at Hasholme Hall (below Chapter 5). Although not producing cropmarks,



Illus. 2.15 *Cropmark sites from the Holme landscape block: enclosure complexes and ring ditches. Scale 1:10,560*

the settlement excavated at Bursea House (Chapter 5) also comprised a similar multiple enclosure site. The enclosure at Bursea Grange is dated to the Iron Age (despite being aceramic), whilst the enclosures at Hasholme Hall and Bursea Grange originated in the Iron Age but continued into the Roman period.

2.2.3 Settlement, land use and production

Attempting to interpret the nature of settlement and land use from air photographic evidence is at best a very difficult and tentative exercise. At the heart of the problem is how to interpret morphologically simple forms such as enclosures that were constructed for a wide variety of purposes. Bewley (1994, 23) has noted that it is a mistake to assign terms such as settlement or farmstead to such simple forms without supporting evidence. The most obvious such evidence comes from the excavation of the cropmark sites themselves or others which are morphologically closely similar. Interpretation of excavated sites is straightforward. Where comparisons are made with morphologically similar sites it is most important that the form is sufficiently distinctive to be unambiguously identifiable. We thus remain largely dependent upon excavation, a source which has not been systematic in its coverage of the full range of forms of site seen in the Holme area. For the most part analogy with excavated examples of simple features such as enclosures cannot help us distinguish specific uses. We also need to be aware that features such as enclosures can be used and reused over time for a range of different purposes, changing from settlement to production area to field for example, or may have multiple functions simultaneously.

Given these issues it is important to stress some points of caution about the interpretation of air photographic evidence in relation to the excavation and field survey data from Holme-on-Spalding Moor. Analogies should only be taken to provide tentative models to be subjected to further investigation. For instance, it may sometimes be possible to use evidence for structures such as roundhouses to identify possible settlement sites. However these should not automatically be assumed to be contemporaneous with their surrounding ditches or enclosures (as noted by Haselgrove (1984) in the context of Iron Age 'enclosed' settlements in northern England). Equally it is a mistake to automatically equate ploughsoil artefact assemblages with structural features underlying the cultivated horizon and which appear on the aerial photographs even though on occasion the artefacts may have derived from damaged parts of these deposits. Given this proviso, it is still interesting and useful to compare the location and distribution of activity areas from field-walking and the evidence of air photography

On the basis of these comments the following account only identifies specific habitations where there are sound structural indications (ie. probable roundhouses and/or pit groups), evidence from excavation, or occasional tentative suggestions from excavated analogies. Settlement is discussed more in terms of the wider occupation of specific locations indicated by the cropmarks. Emphasis is laid on both the specific shape of features and on their structural relationships, in particular on the creation of spaces, boundaries and possible ways of movement through the landscape as a reflection of how it may have been utilized. Rather than discuss each complex in succession, the following is a summary of certain trends inferred from detailed study of the elementary structural relationships of the cropmarks and a consideration of how space and movement could be affected by their construction. Other physical characteristics (such as shape and size) and evidence from other sources were also included where they may be a reflection of date or function.

The considerable range of linear cropmarks in the area is dominated by enclosures which were initially divided on the basis of their E.S.R.s into single or multiple phasing. Single phase enclosures are those showing no direct evidence for the addition of elements through conjunction. This means only that they may be single phase constructions. As can be seen below, they may have additional phases undetected by air photography. Multiple phase enclosures are those that clearly appear to have been constructed in a number of stages which may have been separated by many years or a matter of days. The broad scatter of other linear features and occasional maculae (isolated amorphous features) were recorded as separate categories. There are reasons to believe that in a number of cases, the linear features represent fragmentary parts of the enclosure types discussed above. These have been omitted from Illus. 2.14 and 2.15 but are shown on the maps for comparison. In all instances the archaeological relevance of these categories were assessed on the basis of three criteria. First are there any apparent chronological differences between these categories? Second, can they be considered to represent different forms of spatial structuring of the landscape, perhaps relating to variable land use and/or social organization? Finally, what if anything is the relationship between the categories above and specific activities, in particular the evidence for iron-working and pottery production discussed elsewhere in this volume (Chapters 4 and 5)?

Single enclosures

An analysis of the size and shape of the limited number of single enclosures is summarized in Illus 2.14. For the purposes of discussion circular enclosures under 350m² have been excluded here as they are likely to represent either roundhouses or possibly barrows and are discussed further in the context of evidence for the location of settlement below. It is immediately apparent that the single enclosures cover a diverse range of forms and sizes with little obvious patterning within the small sample available. The use of a conventional morphological typology (such as MORPH, see Edis *et al* 1989) often produced classes of only one or two examples. A number of the enclosures illustrated in Illus. 2.14 are probably fragmentary examples of complexes (cf. Illus. 2.14 and 2.15 nos. 6 and 29). The ovoid and rectilinear double ditched enclosures do appear to be distinctive types. Ovoid enclosures here and elsewhere in the region (see Halkon

1987, 80; Loughlin and Miller 1979, 42) are found as isolated examples and do not seem to feature as components of any of the agglomerated complexes. Field-walking suggests these sites pre-date the Roman period.

Multiple enclosures

The multiple enclosure cropmarks identified follow a more distinctive trend. As noted above the majority are clearly formed through the addition of enclosures (eg. nos. 31 and 41) to pre-existing enclosures and/or double ditched linears (probable trackways, eg. no. 40). The trackways are usually centripetal and often defined on one side by their flanking enclosures, linking together many of the enclosures in a particular complex, but rarely extending beyond (eg. 32 and 33). A number of the trackways seemingly separate the enclosures from unbounded land to one side (frequently, as noted earlier, in low lying floodplain locations for example nos. 28 and 29). In some cases the trackways open out at one end into open areas, again in low lying locations (eg. nos. 29 and 43). The vast majority of enclosures forming the complexes are rectilinear but shape does not appear of primary significance as pre-existing boundaries (natural or constructed) often appear to be the determining factor in their arrangement (eg. 42). The rare possible examples of larger synchronic complexes (eg. 28 and possibly 39) are undated though there is some suggestion that complex 28 may be later in date than the other cropmarks.

In the absence of fully excavated examples from the survey area or its immediate surroundings multiple enclosures can only be dated by analogy with other areas or by the field-walked finds from them. Parts of one complex were excavated at Bursea House (Chapter 5.3) and drainage trenches provided samples of finds from another at Hasholme Hall (Chapter 5.2). In both cases the ditch fills were dated to the later Iron Age and early Roman periods. A wider search of the regional literature for probable analogies did not immediately yield similar examples though there are some links with sites at Brantingham and North Cave (Dent 1989) and with the excavated complex at Dalton Parlours (Wrathmell and Nicholson 1990). At Dalton Parlours an aggregated Iron Age complex evolved and expanded gradually where the initial enclosures were constructed without needing to conform to existing boundaries. Later enclosures adapted and incorporated some of the existing structures to form shifting patterns of enlargement or subdivision that would not be identifiable on aerial photographs.

Many of the Holme-on-Spalding Moor multiple enclosure complexes were walked and concentrations of Roman pottery recovered from them but given the problems of associating the two forms of information noted above (see Chronology) we can say little about their full date range other than that they are likely to have extended through the later Iron Age and Romano-British periods at least. Some indication of this comes from the evidence of Corder's (1930) excavations of the late Roman kilns at Throlam (complex no. 38 Gazetteer site 74). Comparison of the distribution of major and minor iron-working sites with the cropmarks provides possible insights (see Illus. 2.4-2.13). The riverine location of most of the major iron-working sites is noted elsewhere (below Section 2.3.5) but significantly they are also rarely associated with pottery scatters or cropmarks. Unlike the minor iron scatters these sites do not appear to be closely associated with settlements and they may have occupied open, wooded or marginal locations within the landscape. Such an interpretation is largely speculative but is currently supported by the available survey evidence. The Welham Bridge excavation suggests that the construction of such sites in open areas may be a consequence of decreased cropmark visibility in the lower lying areas along the Foulness (below Chapter 4.2).

Ring ditches

Evidence for structures within multiple enclosure complexes is reasonably common with probable roundhouses showing in at least six cases (complexes 30, 32, 33, 36, 38 and 41). Significantly they are found as single examples within individual compounds, not as multiples, perhaps suggesting that settlement nucleation was limited. In this respect their locations are similar to those of the single enclosures which also rarely show evidence for more than a single roundhouse (eg. 13). Elsewhere there are four clear examples of unenclosed multiple ring ditches (45, 46, 48 and 49). Cropmark 45, however, appears to be a probable barrow group and only the latter three perhaps represent multiple or multiphase roundhouses. On the whole evidence for unenclosed roundhouses that may represent open settlements is scarce with only two single examples (47 and 50) in addition to the four multiple ones noted above. It is possible that other seemingly enclosed examples may belong to unenclosed phases but this is impossible to assess with the available information. Cropmark 46 may be part of an enclosed site that is only partially visible but the four others, and 48 in particular, do appear unenclosed.

2.2.4 A tentative model for landscape change

The air photographic evidence for the Holme-on-Spalding Moor area is in part at least soil specific and localized, producing a rather fragmentary record. The lack of excavation or specific parallels makes dating and interpretation difficult but some tentative suggestions on the nature of settlement and landscape are possible if we consider the presence of field-walked pottery from the cropmarks shown in Illus. 2.14 and 2.15 as a partially reliable guide to Roman occupation. Table 2.1 shows the relationship between the cropmarks listed in Illus. 2.14 and 2.15 and field-walked pottery from the survey. The scarcity of Iron Age pottery from the region is a clear phenomenon noted elsewhere in this volume and in the account that follows the chronology is thus simply divided into probable first millennium BC (largely aceramic) and Roman (predominantly second- to fourth-century A.D. pottery) phases. The model outlined here is intended only as a framework for further discussion and research into the landscapes of the survey area. Much of it is, of necessity, speculative but wherever possible is linked to trends in the chronological, spatial and structural nature of the evidence.

The earlier phase of occupation in the area may have been characterized by single ovoid and or rectilinear enclosures. The two ovoid enclosures (20 and 21) appear as isolated examples to the south-east of the region. Both occupy locations close to main watercourses running into Walling Fen. Both had single entrances facing their respective streams and appear to have been approached by water. Neither these examples nor others elsewhere in the region appear to feature as part of enclosure complexes or to be associated with Roman pottery. They may represent the earliest foci of occupation in this area in the first millennium B.C.

Eleven of the cropmarks 1-24 (illustrated in Illus. 2.14) were field-walked (Table 2.1). Of these only one was directly associated with Roman pottery (cropmark 17). The single and double ditched rectilinear enclosures appear as both isolated examples and as part of complexes. The one excavated example at Bursea Grange is dated only in that it is an aceramic site with a round house and thus likely to be of the first millennium BC. Clear simple examples (eg. 4, 13, 18 and 24) are usually aceramic (only 17 is an exception) and probably predate the development of the aggregated complexes. Their presence seemingly incorporated into complexes (eg. 6, 35 and 44) would suggest that they were also a significant form during this development. The presence of this type as simple aceramic examples (13, 14, 16, 18, 23 and 24), as a single simple site associated with field-walked Romano-British pottery (17), and as part of complexes with and without surface Romano-British ceramics (5, 6, and probably 35 and 44) suggests a long lived or ubiquitous form, initially developing in the Iron Age but continuing as part of aggregated complexes during the Roman period. They probably do not continue as single enclosures in the Roman period. The overall distribution of rectilinear enclosures is again predominantly riverine with the main exceptions being cropmarks 1-3 and 5-7 around Church Hill. Of these cropmarks 2, 3, 5, 6 and 7 appear to be fragments of possible complexes. Only one further example (12) may lie further west up the river Foulness, though this too may be part of a neighbouring complex (41). Illus. 2.16 shows the distribution of cropmarks 1-24, highlighting the riverine, eastern bias in their recorded distribution. It is interesting to note that those examples where entrances are clearly defined (4, 13, 14, 17 and 19) all face the nearest visible watercourse. This appears to reaffirm the close riverine link also noted for ovoid enclosures.

The detailed developmental sequence for each of the aggregated complexes discussed earlier is impossible to identify on the basis of the air photographic evidence alone but some comments are possible. Table 2.1 shows that of the twenty complexes recorded in Illus 2.15 (25-44) thirteen were walked. Of these eight were closely associated with Roman pottery (two through excavation) suggesting longer or later

Table 2.1

Relationship between cropmarks and field-walking finds from the landscape block

The cropmark number refers to Illus 2.14 and 2.15

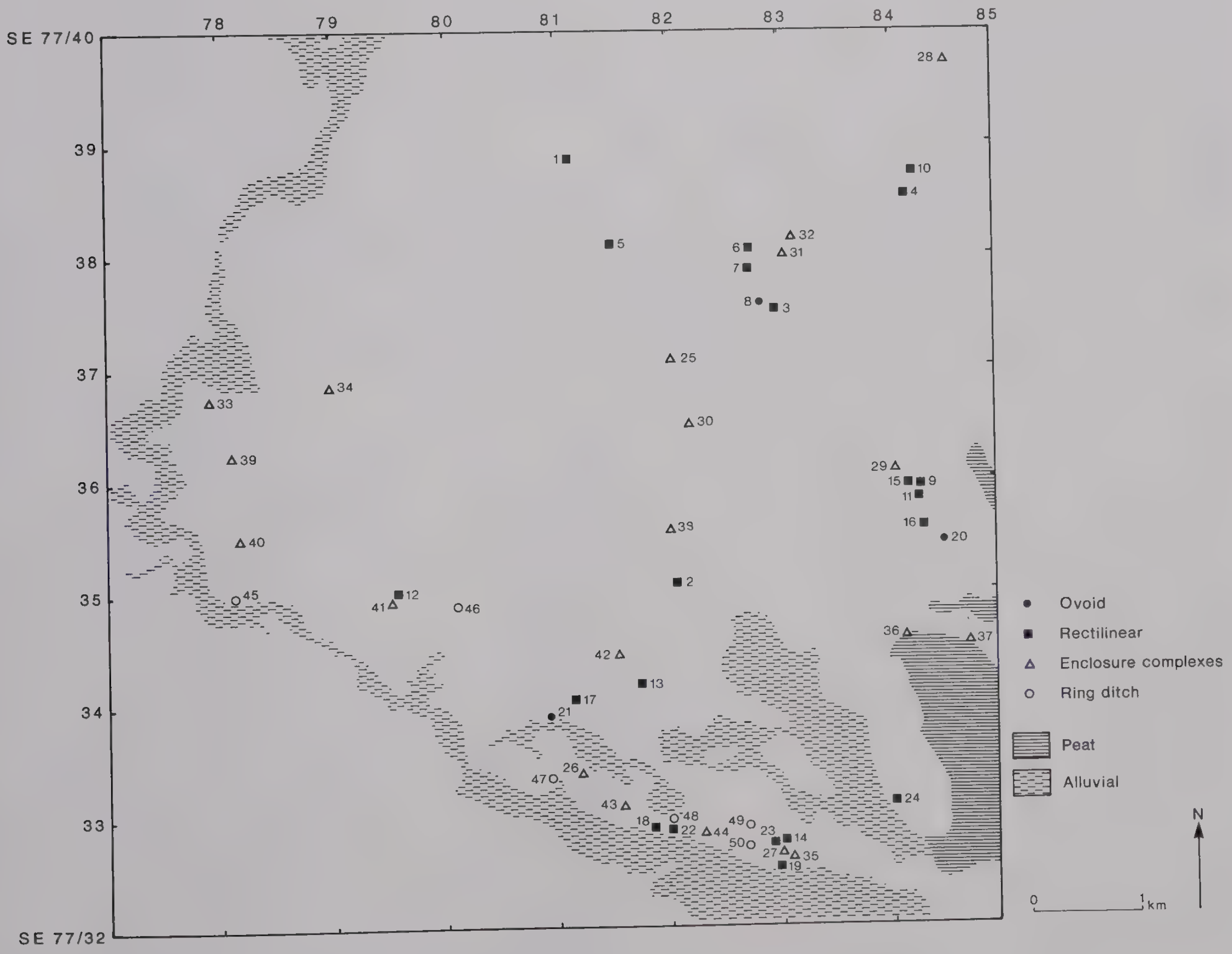
No.	Cropmark Type	Field-walking / Excavated evidence
1	Rectangular enclosure	Not walked
2	Rectangular enclosure	Not walked
3	Rectangular enclosure	No pottery
4	Rectangular enclosure	Not walked
5	Rectangular enclosure	No pottery
6	Rectangular enclosure	Not walked
7	Rectangular enclosure	Not walked
8	Ovoid enclosure	Not walked
9	Rectangular enclosure	Not walked
10	Rectangular enclosre	No pottery
11	Rectangular enclosure	Not walked
12	Rectangular enclosure	Not walked
13	Rectangular enclosure	No pottery (Bursea Grange - see Chapter 3)
14	Rectangular enclosure	No pottery
15	Rectangular enclosure	Not walked
16	Rectangular enclosure	No pottery
17	Rectangular enclosure	Roman (Gazetteer no.8)
18	Rectangular enclosure	No pottery
19	Rectangular enclosure	Not walked
20	Ovoid enclosure	Not walked
21	Ovoid enclosure	No pottery
22	Rectangular enclosure	No pottery
23	Rectangular enclosure	No pottery
24	Rectangular enclosure	Not walked
25	Enclosure complex	No pottery
26	Enclosure complex	Roman (Gazetteer no. 18)
27	Enclosure complex	No pottery
28	Enclosure complex	Not walked
29	Enclosure complex	Not walked
30	Enclosure complex	Roman (Gazetteer no. 96)
31	Enclosure complex	Not walked
32	Enclosure complex	Roman (Gazetteer no. 5)
33	Enclosure complex	Not walked
34	Enclosure complex	Roman (Gazetteer no. 21)
35	Enclosure complex	No pottery
36	Enclosure complex	Not walked
37	Enclosure complex	Not walked
38	Enclosure complex	Roman (Throlam - Gazetteer nos 74, 75 and 77)
39	Enclosure complex	Not walked
40	Enclosure complex	No pottery
41	Enclosure complex	Roman (Gazetteer no. 88)
42	Enclosure complex	Roman? (Gazetteer no. 9)
43	Enclosure complex	No pottery
44	Enclosure complex	Roman (Hasholme - Gazetteer no. 37b; see also Chapter 5)
45	Ring ditch	Not walked
46	Ring ditch	Roman (Gazetteer nos 49 and 50)
47	Ring ditch	Roman (Gazetteer no. 24)
48	Ring ditch	No pottery
49	Ring ditch	Roman (Gazetteer no. 31)
50	Ring ditch	Fe slag only (Gazetteer no. 118)

occupation spans for these sites than for the single enclosures. Although there is great possibility for overlap in the two forms of structure there is some suggestion that the complexes develop later than the enclosures. Most of the complexes appear to have developed around an existing enclosure (eg. 35, 44 and possibly 6 and 29) or several separate enclosures (possibly 32 and 38). Morphologically, the rounded sides and corners of the majority of enclosures in the complexes are diagnostic of piecemeal encroachments into previously open areas (cf. Wrathmell and Nicholson 1990, 275). If so this process may have started at least during the first millennium B.C. as some extensive complexes, though fully walked, had no associated Roman pottery (eg. 25 and 35).

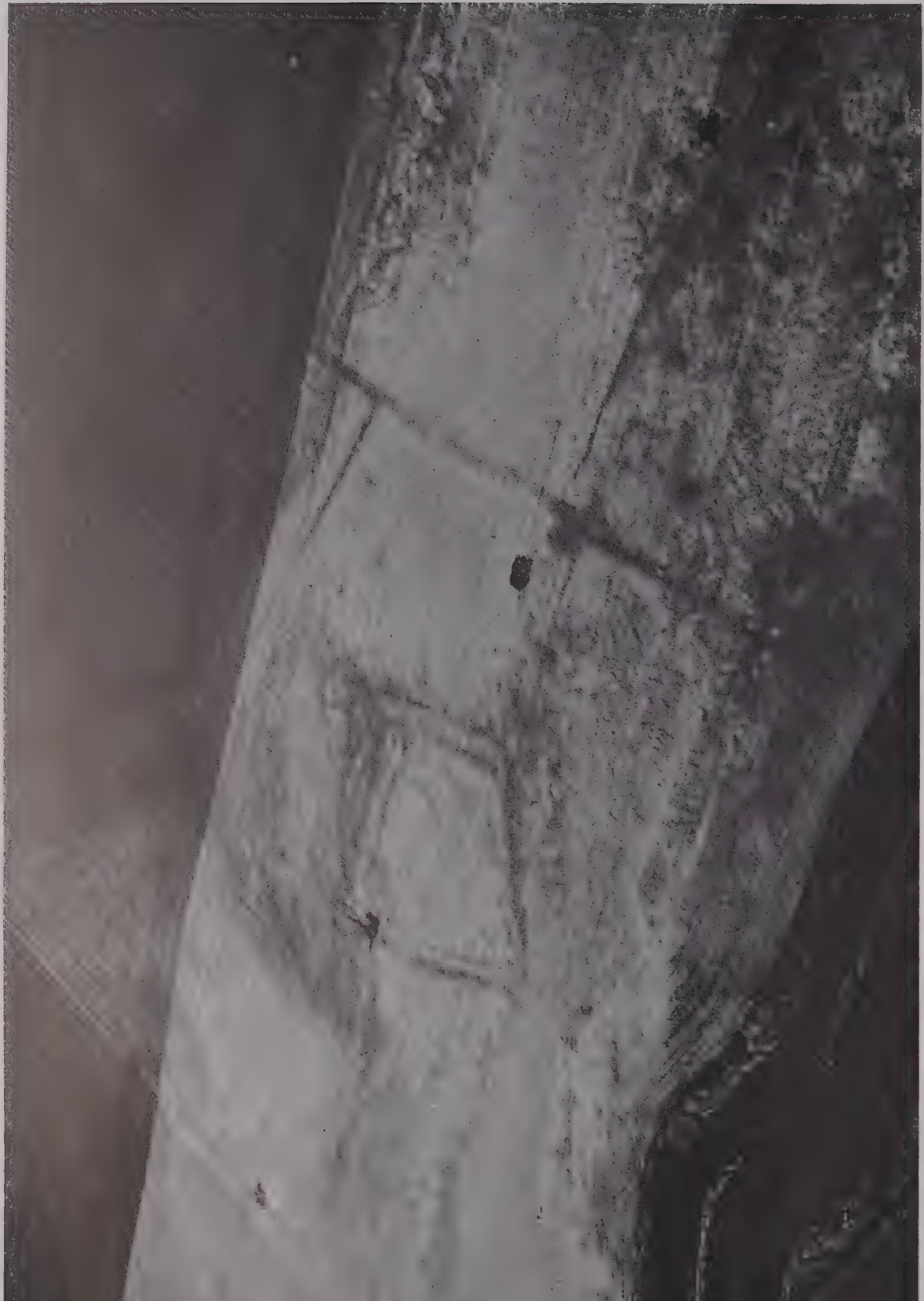
There is a great deal of morphological variability in the complexes which appears to relate to localized considerations of topography or pre-existing structures. The prevalence of agglomerated complexes suggests a relatively high level of continuity within the landscape both in general location and in structure. This does not of itself suggest direct chronological continuity but rather the adoption or adaptation of existing natural or physical features. It seems likely that these complexes developed and expanded around an existing separate enclosure or enclosures during the first millennium B.C. to become the dominant form in the Roman landscape. This becomes more apparent given the seeming absence of villas and single enclosures dated to the Roman period.

The wider distribution of the complexes shown in Illus. 2.15 is plotted in Illus. 2.16. A riverine location is still common for many of the complexes but they are also found further up the Foulness to the west and away from the main watercourses in the centre of the survey area. This more even distribution produces a picture of relatively dense occupation for most of the landscape (particularly given the possibility of poor recognition of sites on the clays) by the Romano-British period. The orientation and siting of individual complexes is closely related to the local topography and trackways, when present, are centripetal linking the enclosures of one complex and sometimes seem to delimit the complex from open land to one side. The complexes were therefore probably not constructed with respect to larger scale communications routes or structures, but seem to be concerned with localized exploitation of the landscape (though it is possible that communication routes were more extensive but were either unmarked or by water).

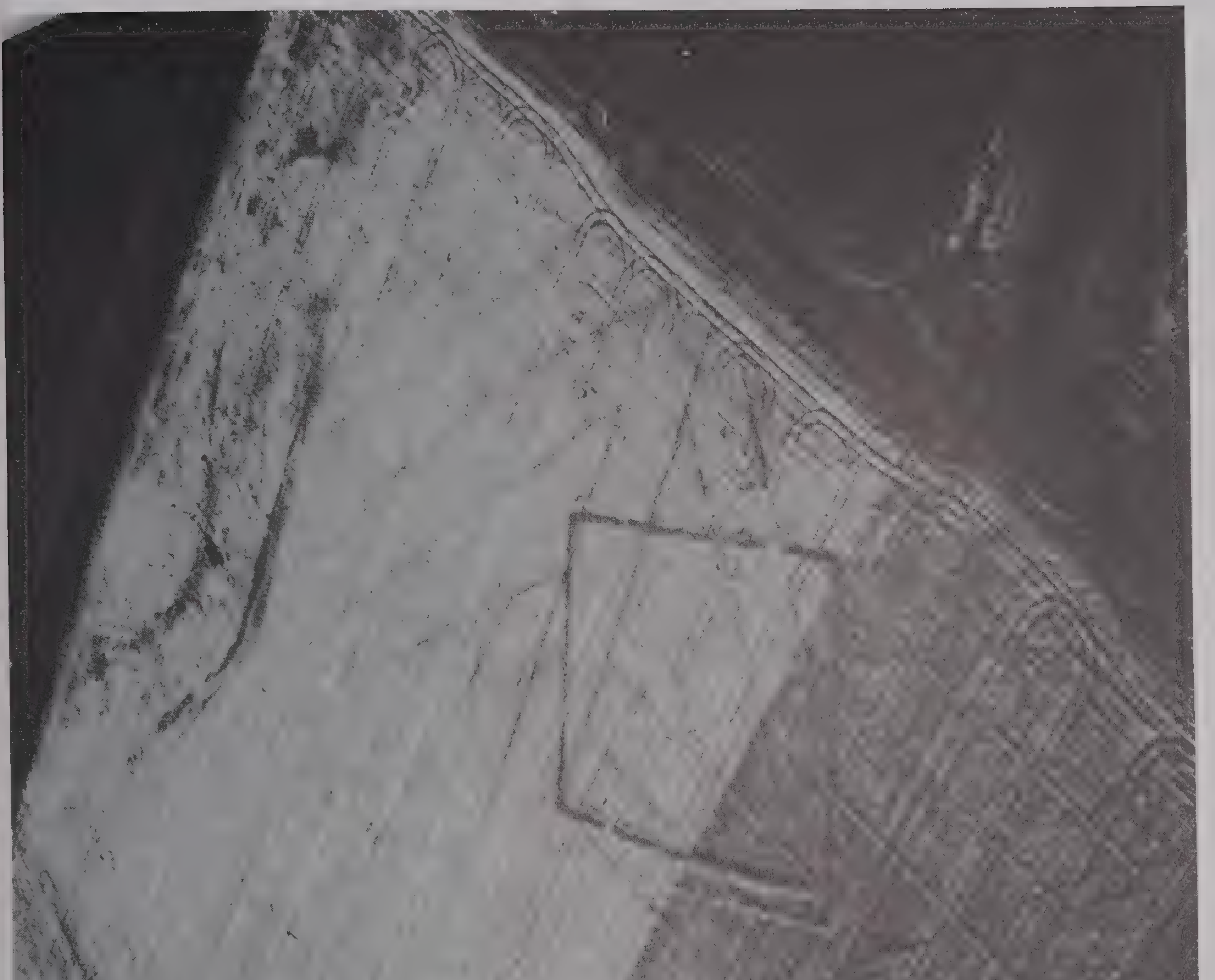
At first glance comparison between the distribution of single enclosures and complexes (Illus. 2.16) might suggest a degree of expansion and infilling of the landscape with the appearance of the latter. This would assume that the complexes were later foundations, not occupied over a longer period. The processes of agglomeration characteristic of these



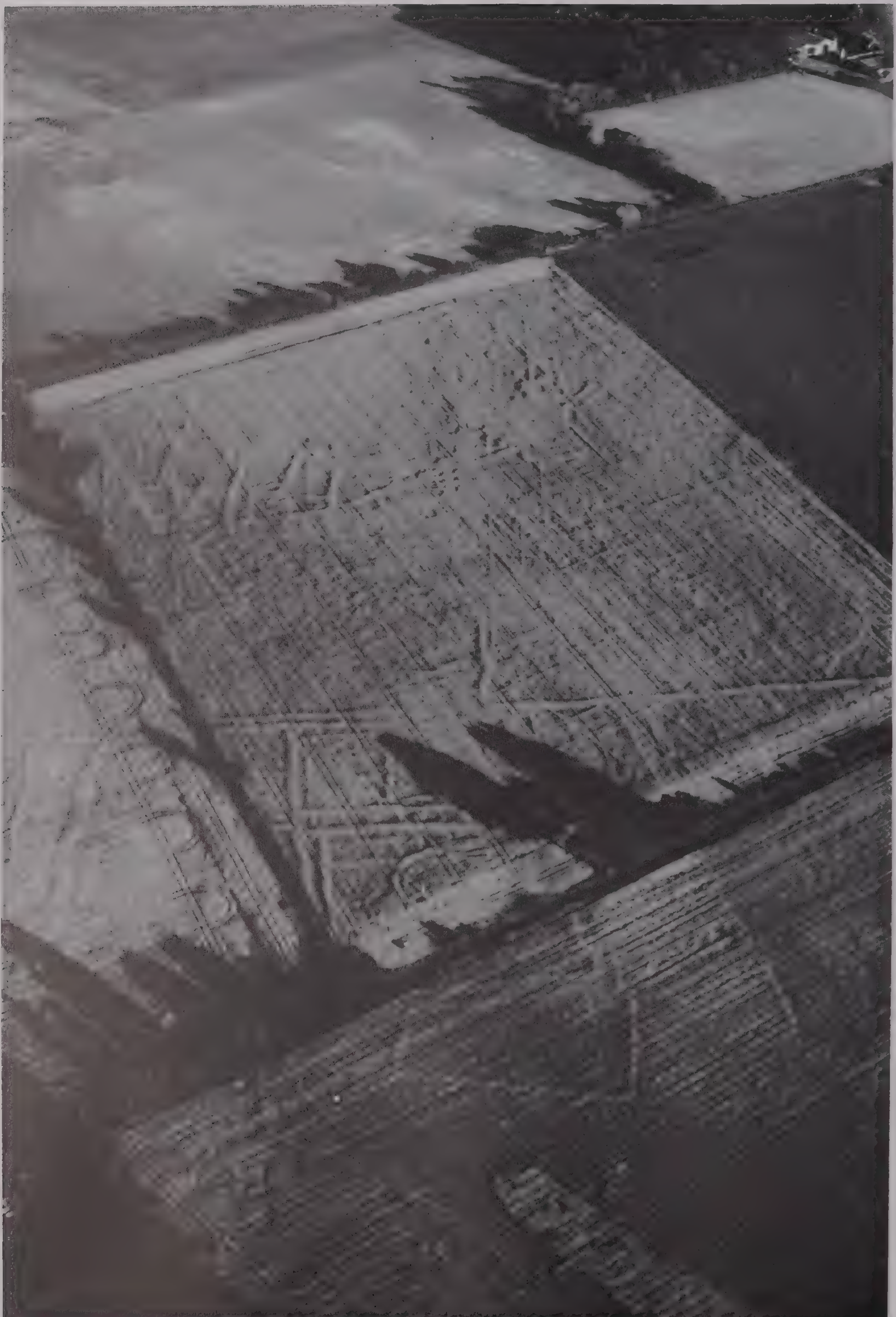
Illus. 2.16 *Distribution of aerial photographic sites shown in Illus. 2.14 and 2.15*



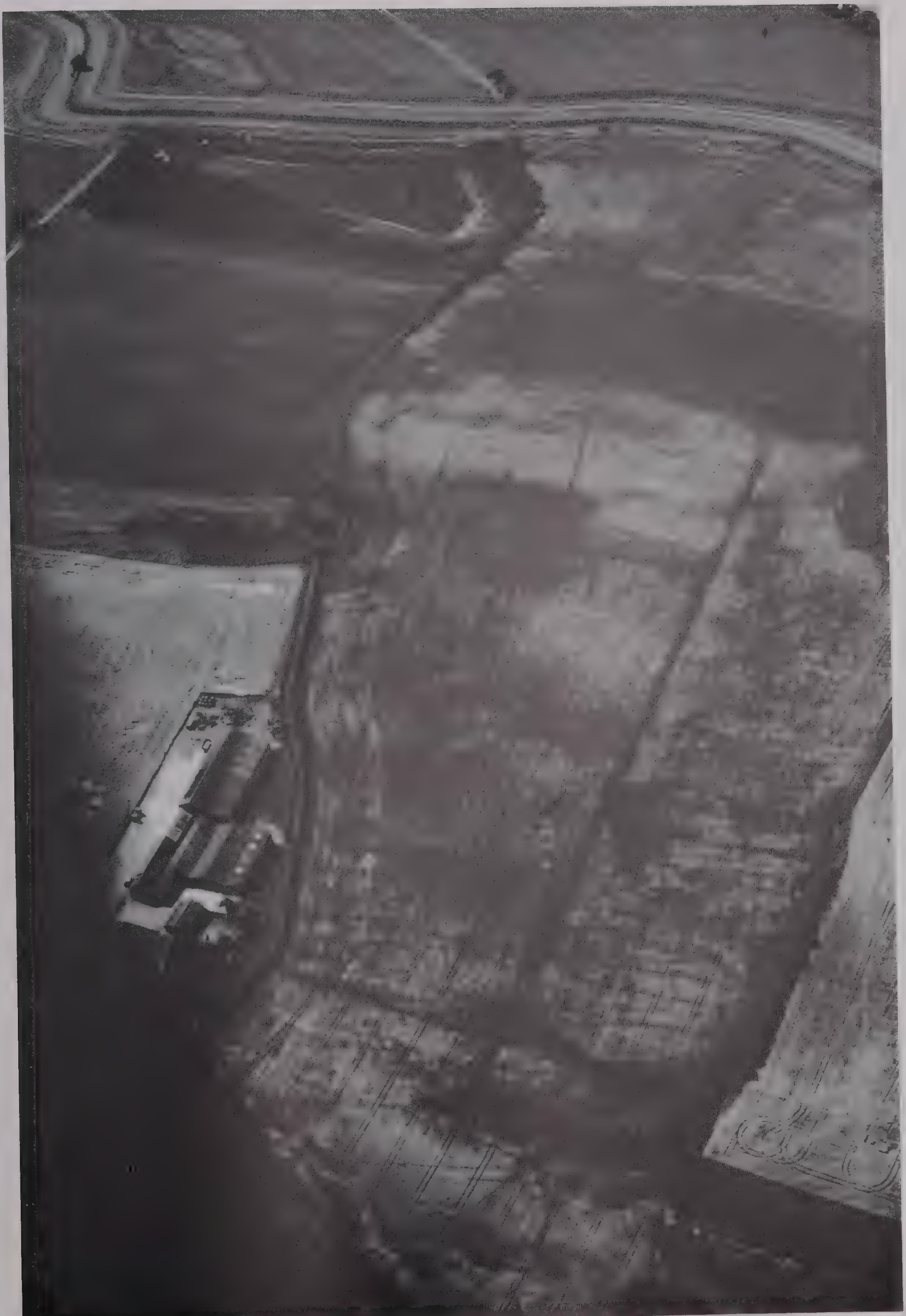
Illus. 2.17 Aerial photograph of rectangular enclosure at Hasholme Hall SE 818328 from the south (Illus. 2.14 no. 14). Photograph by Peter Halkon, July 1995



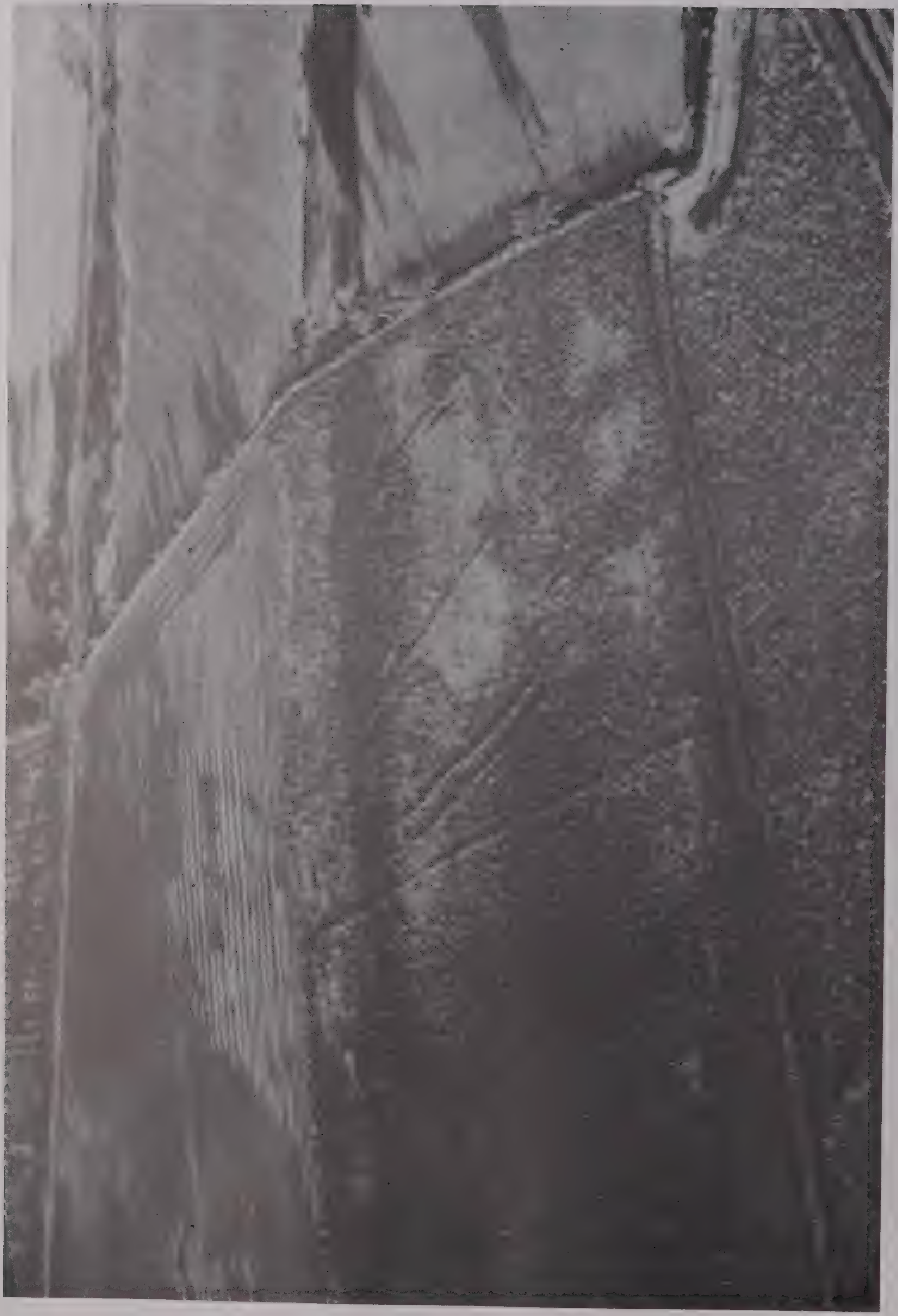
Illus. 2.18 *Aerial photograph of rectangular enclosure at Bursea Grange SE 817343 from the south (Illus. 2.14 no. 13). Photograph by Peter Halkon, July 1995*



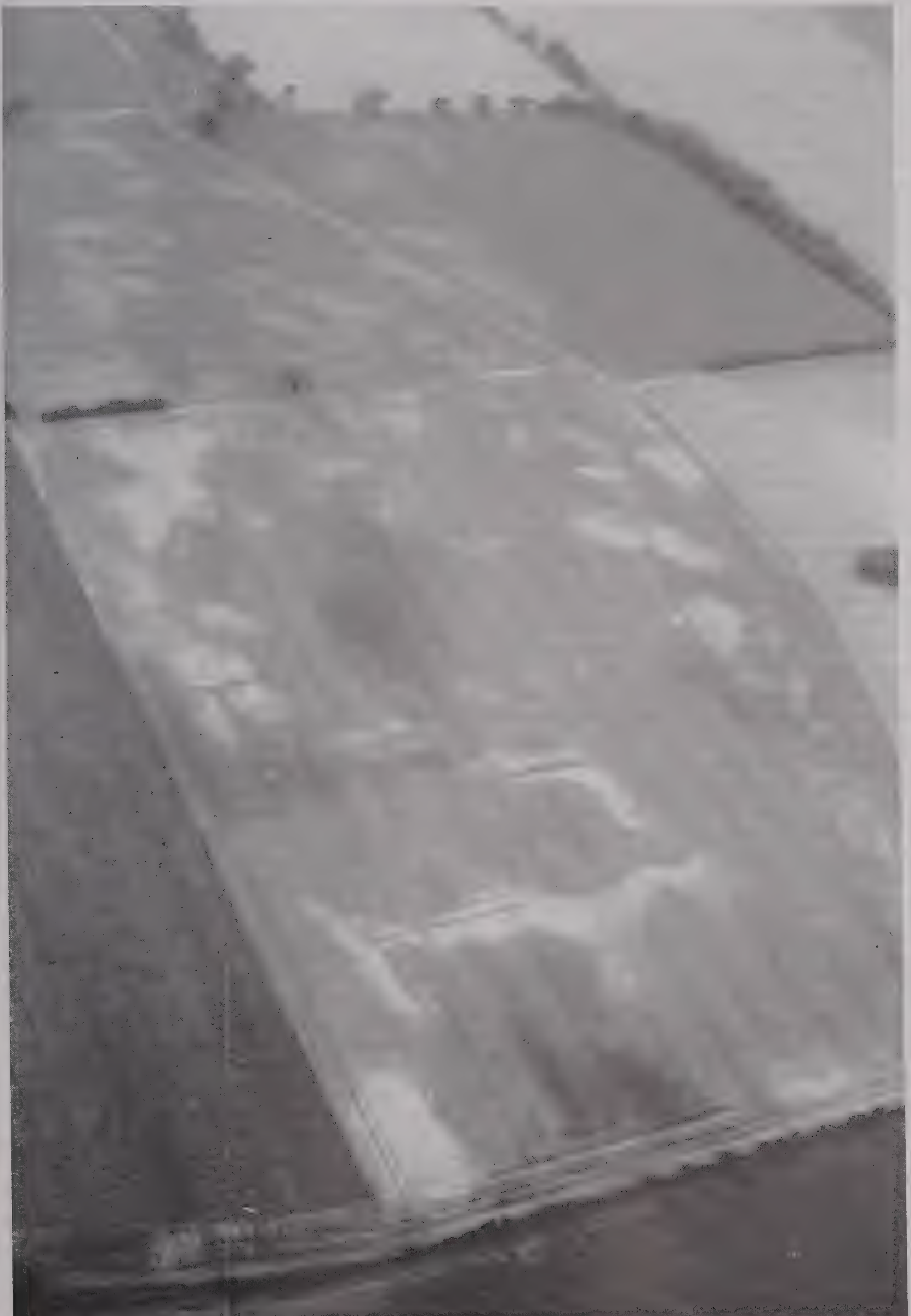
Illus. 2.19 *Aerial photograph of multiple enclosures at Throlam SE 819358 from the northwest Illus. 2.15 no. 38). Photograph by Peter Halkon, July 1995*



Illus. 2.20 *Aerial photograph of multiple enclosures at Hasholme Hall SE 819331 from the north. Photograph by Peter Halkon, July 1996*



Illus. 2.21 *Aerial photograph of multiple enclosures at SE 829326 from the south. Photograph (of sugar beet crop) by Martin Millett, September 1984*



Illus. 2.22 *Aerial photograph of multiple enclosures at SE 828327 from the east. Photograph by Peter Halkon, July 1986*

complexes, the excavated evidence from Bursea House (Chapter 5.3), and analogy with the Dalton Parlours excavation suggest that they did develop over much of the first millennium B.C. and therefore reflect locational stability of occupation. If this suggestion is correct, individual enclosures were present in the west of the area but were incorporated in the later development of complexes. The presence of single enclosures or clusters of enclosures around the northern and western fringes of the Walling Fen thus represents not intense early occupation but locational instability and abandonment, possibly as a consequence of their siting in marginal wetlands. Given this explanation it is also difficult to investigate whether the complexes represent a form of occupational nucleation through time. This depends on whether the presence of individual enclosures represented their abandonment as a consequence of movement to the developing complex sites or simply to a new unoccupied location.

As a tentative model it seems that in the first millennium B.C. we see a landscape of single ovoid and rectilinear enclosed and open (or palisaded) sites (like Bursea Grange, below Chapter 3.2). If the ovoid enclosures are earliest they suggest limited settlement around the fringes of Walling Fen and its main tributaries, subsequently expanding throughout the creek system with the appearance of rectilinear enclosures. Superficially these forms of settlement do not appear to have spread further up the Foulness or away from it but I would suggest this is probably a consequence of stability of settlement in this area, with earlier enclosures being incorporated within later complexes. Possible open settlements of this date also lie close to the main rivers and do little to change the picture irrespective of their precise chronological relationship with the enclosures.

At some point from the first millennium B.C. aggregated complexes become the norm such that they appear to dominate the Roman landscape. The only other recognizable form of settlement at this time appears to be open settlements of limited size. There are no obviously Romanized forms of settlement (such as villas) and large nucleated sites seem to be absent. It is possible to suggest that the complexes do represent a limited form of settlement nucleation largely on the evidence for multiple roundhouses in contemporary phases at Dalton Parlours and the presence of more than one roundhouse in different parts of some of the Holme complexes (eg. 32, 33 and 38). Any more detailed consideration of this would require excavation to determine the level of contemporaneity of the different elements of each complex. By the Roman period at least, settlement appears to be fairly densely and evenly spread across the region, but organized according to purely local concerns of topography and resource exploitation. The local landscape of the complexes now appears to be divided broadly into two main zones; an inner, structured area of buildings and smaller enclosures often associated with pottery manufacture, and outer largely unbounded areas probably incorporating woodland, wetland, pasture and foci for iron production. One particular area around Welham Bridge may have been a special landscape dedicated to iron production but otherwise sparsely occupied. Resolution of this and the other issues raised above will largely have to await future detailed survey and excavation.

2.3 The field-walking evidence

2.3.1 Aims and methods of sampling

Until 1982 field-walking had been centred mainly around known kiln sites at Hasholme (SE 820330) and Bursea (SE 815337) (Halkon 1983). In 1983 the research area was expanded to an 8 by 8km block (see Chapter 1.2) with the aim of establishing the nature and extent of Romano-British settlement and industry and relating this to environmental factors. The microtopography, soils and drainage of the study area are so varied that any general conclusion concerning the relationship between soils, drainage and sites based on any low intensity random sampling strategy seemed inappropriate. In Chapter 1, the likelihood that the environmental constraints affecting modern settlement patterns are very similar to those affecting settlement in the Roman period was discussed, therefore a systematic method of sampling based on the present tenurial system, and ensuring an even coverage of the area was adopted.

Using sheets SE 83 (1977) and SE 73 (1981), at a scale of 1:25,000, the method adopted was to walk the available land on one farm within each 1km Ordnance Survey grid square. Where a farm straddled more than one grid square, several areas of the same farm were walked in order to give even coverage in each grid square. A list of the farms selected in each km square is shown in Table 2.2. Permission for field-walking to take place was granted on fifty-five farms. This goal was achieved largely due to the generosity, interest and co-operation of the landowners. Permission was refused only on the former airfield where previous work had to be relied upon (Hull Museums site index; Corder 1930; Loughlin and Miller 1979, 42-43). Although it is unlikely that work in this area will alter the conclusions reached here, it is desirable that a detailed survey is undertaken here as much of the airfield tarmac has now been removed and the land returned to arable. Some farmers indicated that they had found material such as pottery and slag and the position of these discoveries was noted.

Section 2.3.6 presents a gazetteer of all the sites found in this programme of work. Throughout the text, sites are referred to according to the numbers used there.

2.3.2 Methods of field-walking

Work was carried out during the winters and springs of 1980-86, as and when the land was available for field-walking. Hall (1985, 27) notes the importance of conditions of agriculture in artefact recovery. Where possible, therefore, fields were walked some time after ploughing, when clods were weathered-out and experience showed that much could still be collected in land sown with winter cereals.

The project relied mainly on experienced volunteers from the Field Study Group of the East Riding Archaeological Society (ERAS), enthusiastic but inexperienced members of the writer's evening classes and sixth form archaeology students. Although Haselgrove (1985, 23) has discussed the effect of the difference in ability or performance on data collection, Shennan agrees with the present author's experience having argued that the 'walker effect' is fairly minor (1985, 43). About 40 percent of the field-walking was carried out by the writer alone.

As opportunities for field-walking were limited to weekends and school holidays, it was only possible to walk most fields once. The fields selected were systematically line walked (Fasham *et al* 1980). Line spacing varied according to the number of participants, but where possible was between 10 and 20m. Pottery, slag and kiln debris were collected and their position plotted onto 1:10,000 O.S. maps. Concentrations of material assumed to represent sites where activity had been focused were then grid walked (Fasham *et al* 1980; Steane and Dix 1978) in 5 or 10m squares laid out by triangulation from a known point on the maps and marked out with canes. Finds were collected in bags allocated for each square. On occasion, this method was also used in conjunction with geophysical surveying (Pocock 1982; Halkon 1983, 19 and 21).

Information was recorded on Humberside Archaeology Unit Field Record Sheets and the area surveyed marked on the appropriate O.S. map. The extent of field-walking is shown on Illus. 2.23. Both finds and records have been deposited in Kingston-upon-Hull City Museums. (The accession numbers are listed below in the Gazetteer.) Copies of the field record sheets have also been deposited in the Sites and Monuments Record.

2.3.3 The results of field-walking

The details concerning each site and findspot have been provided in the Gazetteer (below Section 2.3.6). The various ways in which surface artefacts come to appear on the surface has been reviewed by Haselgrove (1985). It has also been shown artefact scatters may have been deposited by a variety of means (for instance, as a result of manuring) and not all need be derived from the ploughing-up of buried settlement features. In many past landscapes it can reasonably be assumed that concentrations of surface debris are likely to result from the presence settlements sites although in interpreting patterns of surface artefact distribution, due regard must be paid to variations in the quantity and robusticity of materials that were in circulation at different periods (Millett 1985; 1991b). Thus, for instance, in a period or place where there was an abundance of pottery in use at a particular phase it will be found commonly so small scatters might not be particularly significant in indicating the location of past settlement sites. Failure to take account of this may lead to an overestimate of the density of settlement. Conversely, if pottery from certain phases is particularly friable and thus does not survive weathering in the topsoil, its absence cannot be relied upon in mapping past landscape use (cf. Crowther 1983). In the Holme-on-Spalding Moor area these factors have to be carefully considered before we can arrive at any full assessment of the evidence collected.

The area has produced an abundance of robust industrial debris from both iron-working and pottery manufacture and a high volume of pottery, kiln fabric and slag was evidently being deposited during the Roman period. This is thus likely to have been spread across fields and redeposited in a variety of locations throughout the area. Indeed activity since the Roman period has probably continued to spread these finds (cf. Gazetteer site 106). By contrast, the pottery of Iron Age tradition recovered from excavations (below Section 5.8.2) was scarce and appears unlikely to have survived for long if left exposed to the elements on the surface (above Chapter 2.2).

In view of these factors we need to be particularly careful in the interpretation of the field-walking results as there are two evident dangers. First, the presence of Romano-British material needs to be treated with some caution before conclusions are drawn about the distribution of settlement sites and kilns. To allow for this, a distinction has been drawn on the distribution maps between findspots of uncertain significance and those which are most likely to represent the location of a settlement, kiln or iron-working site. This distinction has been made on the basis of the total density of finds and the presence of structural evidence. In several places the clustering of findspots of uncertain significance may itself provide evidence that there was a settlement in a particular area (Illus. 2.24). However, in the locational analyses that follow all findspots of whatever status have been given equal weight.

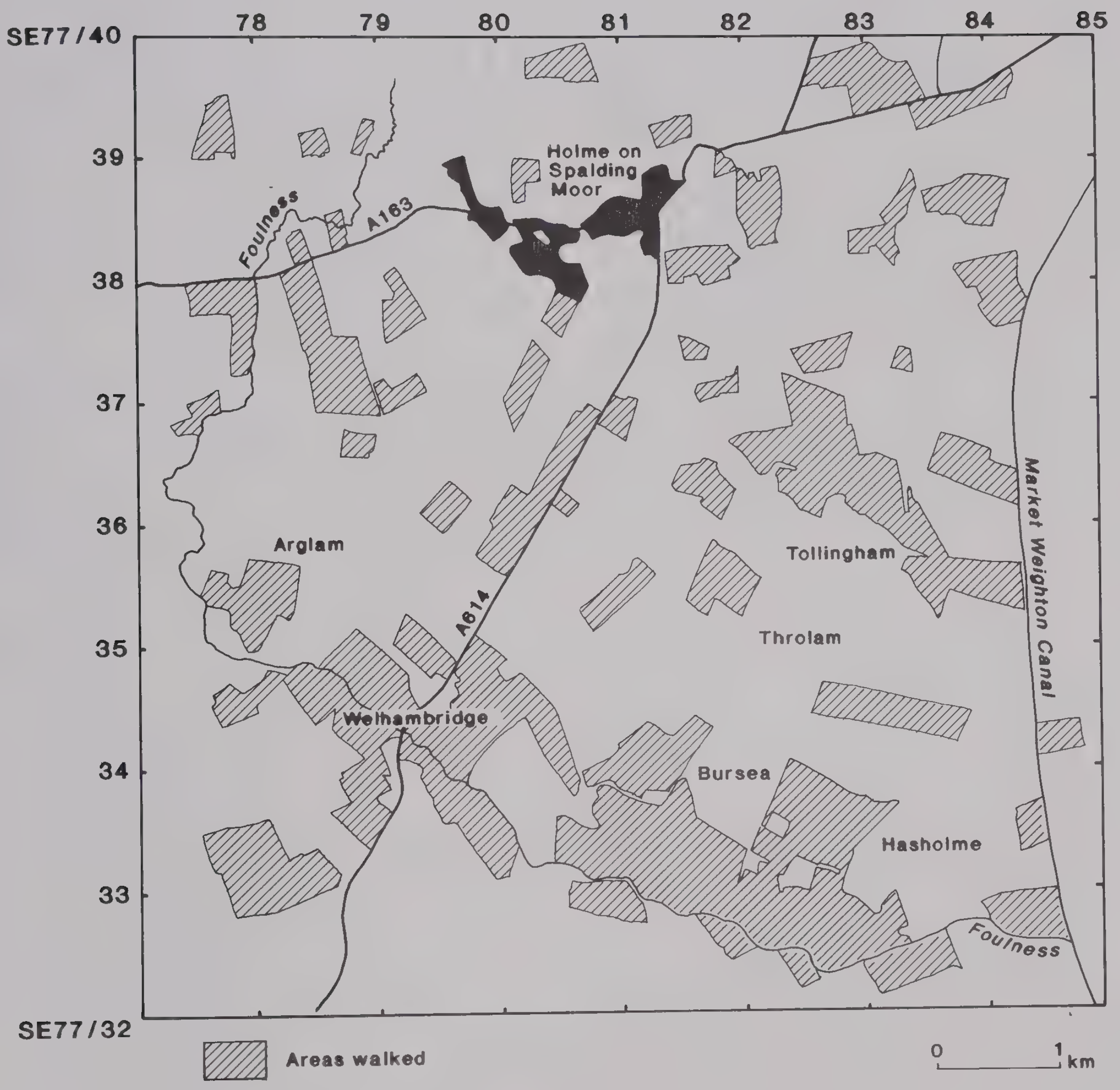
The problem of the absence of Iron Age pottery is more difficult to deal with. A number of the aerial photographic sites are likely to be later Iron Age settlements (above Section 2.2.4) but whilst there is an absence of pottery of this period Romano-British pottery is often present. This probably produces a spurious pattern, so we cannot place too much weight on the presence of Romano-British pottery or the absence of Iron Age pottery from the surface of sites identified by aerial photography.

With these points in mind we can review the evidence produced by the field-walking. The programme identified at total of sixteen certain kiln sites and a further eighteen possible ones. There were five probable Romano-British settlement sites together with sixty-six additional findspots a number of which almost certainly represent other settlements. Of the sixty-six, those most likely to have settlements are gazetteer numbers: 2, 4, 5, 17, 18, 22, 23, 30, 32, 33, 34, 35, 36, 40, 42, 43, 49, 50, 54, 64, 66, 71, 79, 80 and 86. In addition to the sites which produced both Romano-British pottery and iron slag, there were twenty-seven with evidence of iron-working alone. These sites are discussed in more detail below (Section 2.3.5).

Table 2.2

Farms walked within each O.S. kilometre square

SE	77	78	79	80	81	82	83	84
40	Seaton Old Hall	Seaton New Hall	Dial House	Spen House	Park Farm	Bar Farm	Bar Farm	Stray Farm
39	Lincoln Flats	Leylandii Marl Pitts Farm	Woodlands Farm	Runner End (The Homelands)	Castle Farm	Beacon Farm	Woodlands Farm	Woodlands Farm
38	Ragdale Hills (Holme House)	Holme House Monk Farm	Oak Farm	Sober Hill Farm	Rose Tree Farm	Highgate	High Garth	Duck Nest Farm
37	Arglam Grange	Common Farm	Sand Hill Farm	Prospect House	Forest Farm	Skiff Farm Ladies Parlour	Tollingham	Landing Farm
36	Arglam Grange	Arglam Farm	Sand Hill Farm	Lodge Farm	Bramley Farm	Throlam Farm	Hasholme Carr Farm	Tollingham
35	Johnson's Farm	Welham Bridge West Warham Farm	Welham Bridge Farm	Bramley Farm	Bursea Grange	Bursea Grange	Hasholme Hall	Wholsea
34	Fir Tree Farm	Chestnut Farm	Sikes Farm	East Bursea Farm	Bursea House	Hasholme Hall	Hasholme Garth	Wholsea
33	-	Fir Tree Farm	-	Bloomhill Farm	Yokefleet Grange	Hasholme Grange	Sand Hill Farm	Sand Hill Farm



Illus. 2.23 *Map showing the distribution of field-walked areas in the Holme landscape block*

2.3.4 The dating and distribution of sites with pottery

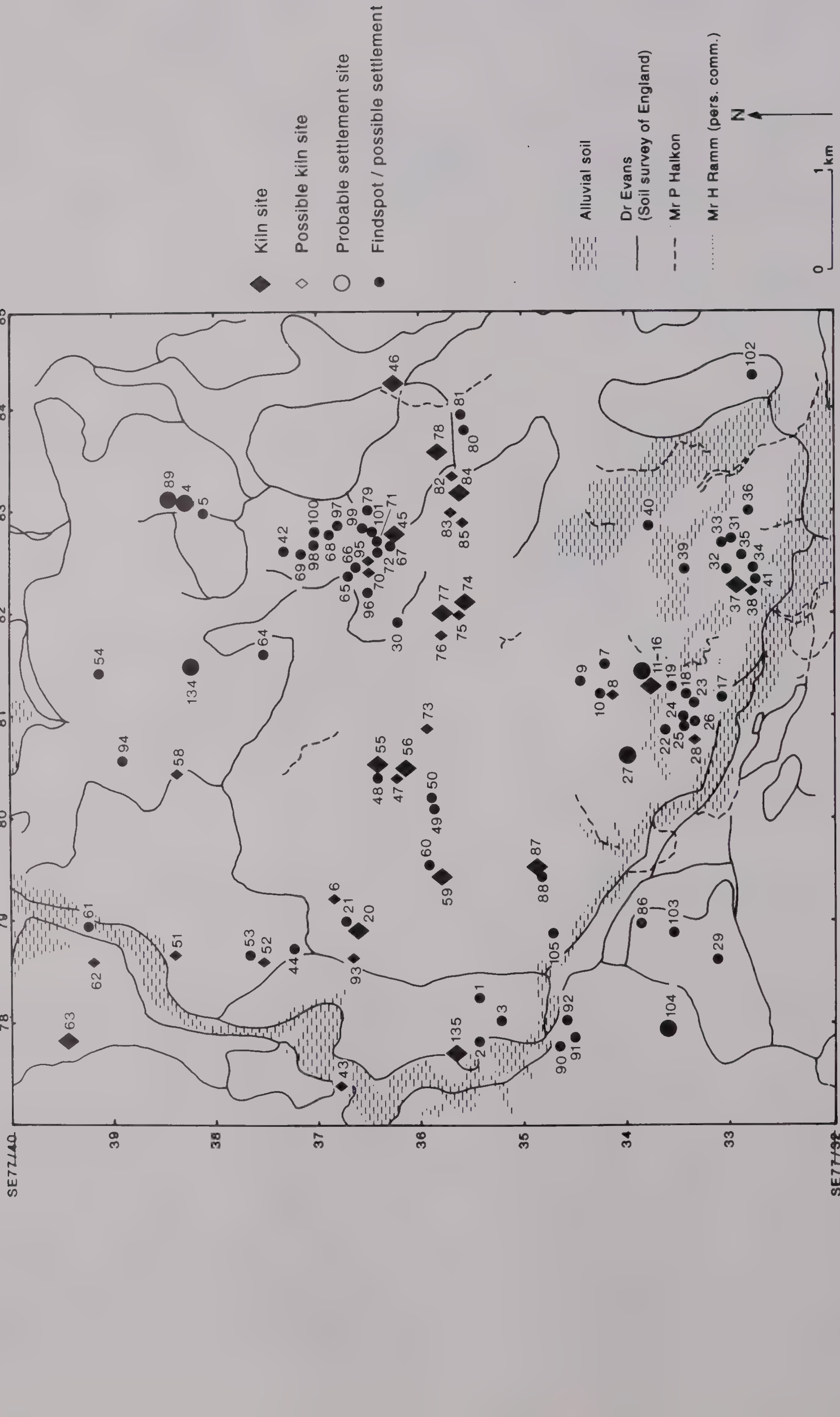
Dating

Any dating of the sites located by field-walking has to rely on the ceramics recovered as only three coins have been found during the survey (Gazetteer nos. 38 and 102). The pottery forms recovered are summarized in Table 2.7 using the typology presented below (Chapter 5.8). The principal problem is that the products of the local kilns are not well dated so reliance has been placed on a numerical assessment of the fabric and forms present together with an assessment of the non-local pottery found. The results of this analysis are summarized in Table 2.3.

Sites and soils

The proportions of each soil type examined by field-walking are shown in Table 2.4. Regression and correlation analysis have shown that the area of each soil type walked was representative of the total area of each soil type within the landscape block (r = 0.95896). Only 2km squares in the south-western extremity of the landscape block were not walked (see Table 2.2). In both these squares the clay soil of the Foggathorpe series was predominant (above Chapter 2.2). Illus. 2.24 shows the distribution of sites whilst Table 2.5 summarizes their distribution in relation to the different soil types.

Eighty-nine percent of the total number of sites lie on the sandy soils of the Naburn, Holme Moor and Portington soil series which form hillocks, ridges and low rises. Preference is shown for the Naburn sand which is highest and best drained of the sands. As yet there is no evidence from



Illus. 2.24 *Map showing the distribution of settlement sites and kilns located through field-walking. For identification of sites see Gazetteer*

field-walking for settlement on the low lying and seasonally waterlogged Everingham sands (see Table 2.4).

The remaining sites were on the waterlogged clays of the Foggathorpe or Worcester soil series (see Table 2.4). Although they are waterlogged, the soils of the Worcester series form the highest land in the landscape block and of the seven sites on the Foggathorpe clays, four were on rises in the fields which were likely to be better drained. There was no evidence for settlement on the alluvium of the Sulham/ Fladbury soil series or the peat in the Down Holland soil series, which are both low lying and waterlogged (see Table 2.4).

Shennan (1985, 53) and Hall (1985, 28) have discussed the avoidance of heavy clay soils by settlement site in the Iron Age and before. Within the Holme landscape block, the avoidance of heavy clays and waterlogged soils would also appear to be a factor in determining the location of Romano-British settlement and kiln sites. This preference for higher, better drained sandy land was also noted by Evans (1985, 93). Although the soils of the Worcester series form the highest land in the Holme landscape block, they are also waterlogged which could explain the low density of settlement on them.

Relationship between sites and watercourses

Swan (1984, 6) stated that most kiln sites lie within 400m of a watercourse, although it is not clear whether she based her work on present day or Romano-British watercourses. A reconstruction of the past drainage in the Holme landscape block has been discussed above (Section 1.4.4). Although absolute dating is not possible, the creek system seems to have remained significant throughout the Iron Age and Romano-British periods. Illus. 2.24 shows the distribution of sites with Romano-British pottery in relation to this drainage system and the distances of sites from the nearest water course are summarized in Table 2.6.

This analysis shows that 76 percent of all kiln sites lie within 400m of a water course; 57 percent of all kiln sites were within 200m of a watercourse and the furthest distance of a kiln site from a water course was 875m. However, location near a water course would not appear to be of importance only to kiln sites as 86 percent of all settlement sites were within 400m of a water course and the furthest distance of a settlement site from a water course was 1225m.

Conclusion

Within the Holme-on-Spalding Moor landscape block, both Romano-British settlements and kiln sites show a marked preference for higher, better drained sandy soils. Evans (1985, 96) noted the similarity between the landscape of the Holme area and that of the Fens, a comparison also made by Metcalfe (1954, 3). It has been noted that Iron Age settlement and Romano-British kilns in the Fenland of Norfolk showed preference for the Greensand and avoided alluvium and peat (Gregory 1982, 351). This compares closely with the site distribution within the Holme landscape block.

The positioning of sites on the sands not only provides a drier environment for settlement, but also gives ready access to the major raw materials for potting. Suitable clay can be obtained either under the sand (Section 1.4.1) or from adjacent clay soils (Illus. 1.4) and sand 'the most frequently used non-plastic constituent of pottery' (Swan 1984, 3) is readily available. Most sites within the Holme landscape block are within easy reach of watercourses, some of which provide a means of access to the Humber estuary and beyond. This supports the relationship between sites and watercourses suggested by Hicks and Wilson (1975, 51), Ramm (1978, 110) and Evans (1985, 94). The concentration of sites around the main creek system at Bursea and Hasholme is particularly noticeable (see Illus. 2.24). It is therefore probable that this estuarine creek system provided an important transportation route for the products of the Holme-on-Spalding Moor kilns.

2.3.5 Iron-working sites

Evidence for the working and manufacture of iron has been known in the Holme area for sometime, to the extent that this and other metallic waste materials are known as 'nosmun', a local tradition attributing this material to Viking iron-working. It occasionally occurs in quantities sufficient to seriously hinder cultivation, several farmers have reported finding pieces so heavy that it took two people to lift them. Some of this material might have been bog ore rather than slag as it can occur in strata up to 300mm thick.

Iron slag was discovered on a total of forty-nine sites during the course of the field-walking. Each site is listed in the gazetteer. Although characterization of the types of slags recommended by McDonnell (1983, 81) has not been undertaken for all these scatters it would appear that evidence for iron smelting and working is present in the form of tap slag, blooms, furnace or hearth bases and cinder. (A full discussion of the slag recovered from excavations at Welham Bridge, site 121, is provided below (Chapter 4.3).)

The sites discovered fall into two main categories which are distinguished on the distribution map (Illus. 2.25):

- iron smelting sites with large amounts of slag in substantial pieces, up to *c.* 0.75m in diameter and sometimes too heavy to lift easily
- sites with small scatters of slag, often in small pieces, *c.* 20-50mm in diameter. Although some iron may have been produced on the latter sites, such slag does not indicate large scale production and some may be associated with smithing. As discussed previously (Section 2.3.3), some of the slag found at these locations perhaps results from redeposition

Site location

In total there were nineteen major iron production sites and a further thirty findspots of slag. The distribution of these sites is shown in Illus. 2.25. It is noticeable that the majority of the major production sites were close to the river Foulness and more especially, at Bursea (sites 110, 111, 113, 115), Welham Bridge (sites 105, 121, 127, 128, 129), and Hasholme (sites 37, 116, 117), adjacent to the dendritic creek system previously noted. Overall seventy-five percent of all sites with iron slag were within 100m of a watercourse. It is likely that this locational preference results from both the use of the river for transportation of finished products and the derivation of the ore from the peat deposits.

Dating

Romano-British pottery was found on sixteen of the forty-nine sites with iron slag, however, only at four of the major production sites (sites 1, 14, 37, 87) was any pottery recovered. At three of them (sites 14, 37, 87) pottery kilns were also found. Given the ubiquity of Romano-British pottery within the landscape its absence from eight-four percent of the major sites strongly suggests that iron production was in decline by the Romano-British period. This tentative conclusion is explored further below (Chapter 4.4) in the light of the excavated evidence.

2.3.6 Gazetteer of sites

The table which follows lists all those sites found in the Holme survey block during the fieldwork described above. In these tables the sites producing Romano-British pottery are listed first (sites 1-106) before those which produced evidence for iron-working (sites 107-133). Two additional sites at which pottery was found are listed as addenda (sites 134-135).

In the tables the following abbreviations are used:

Soil type:

Na = Naburn
HMC = Holme Moor Common
PC = Portington Common
FC = Foggathorpe
WC = Worcester
(For descriptions see above Table 1.1)

Table 2.3

Summary of dating for field-walked sites producing more than 15 sherds of pottery

Site no.	Site type see Gazetteer	Century 1st–2nd	3rd	earlier 4th	later 4th
4	Settlement	▨	▨	▨	▨
6	Possible kiln		▨		
11	Possible kiln		▨		
14	Settlement with iron slag		▨	▨	▨
27	Settlement with iron slag		▨	▨	▨
37	Kiln and iron production		▨		
43	Possible kiln with iron slag	▨	▨	▨	▨
45	Kiln		▨	▨	▨
46	Kiln		▨		
52	Possible kiln		▨		
54	Findspot		▨	▨	
55	Kiln	▨	▨	▨	
56	Kiln		▨		
59	Kiln		▨		
61	Findspot	▨	▨	▨	
63	Kiln				▨
74	Kiln			▨	
78	Kiln			▨	
82	Possible kiln			▨	
87	Kiln with iron production	▨	▨	▨	▨
89	Settlement with iron slag	▨	▨	▨	▨
95	Possible kiln			▨	▨
104	Settlement		▨		
106	Kiln		▨	▨	▨
134	Settlement	▨	▨	▨	▨
135	Kiln		▨	▨	
Hasholme	Kiln excavation	▨	▨		
Throlam	Kiln excavation	▨	▨	▨	▨

Table 2.4

The amount of each soil type walked

Soil type see Table 1.1	Total percent	Area ha	Total area of each soil type walked percent	ha
Holme Moor	45.7	2924.8	53.98	642.4
Naburn	0.5	32.0	0.88	10.5
Everingham	6.0	384.0	2.21	26.3
Portington	10.0	640.0	8.0	95.2
Foggathorpe	22.8	1459.2	13.27	157.9
Worcester	2.8	179.2	3.53	42.0
Down Holland	2.0	128.0	0.98	47.4
Sulham/ Fladbury	9.8	672.2	12.39	147.4

Table 2.5

Table showing the relationship between soils and kilns/sites with Romano-British sherds (presumed settlements)

Soil type	Sites with R.B. sherds	Kiln sites	Total	No. of sites per ha walked
Holme Moor	57	24	81	0.13
Naburn	2	2	4	0.38
Everingham	0	0	0	0
Portington	4	6	10	0.11
Foggathorpe	3	2	7	0.04
Worcester	4	0	4	0.009
Down Holland	0	0	0	0
Sulham/ Fladbury	0	0	0	0

Table 2.6

Distance of sites from water courses

Distance	Settlement sites	Kiln sites	Total
0–100m	37	14	51
101–200m	13	5	18
201–300m	10	5	15
301–400m	2	3	5
401–500m	4	3	7
501–600m	0	0	0
601–700m	2	2	4
701–800m	1	0	1
801–900m	0	2	2
901–1000m	0	0	0
1001–1100m	0	0	0
1101–1200m	2	0	2
1201–1300m	1	0	1
Total	72	34	106

Note: Measurements taken as described in the Gazetteer

D.W. = distance from watercourse. This was measured at 90° from the nearest identified water course and measured in 25m bands.

Method of discovery:

IF	information of site from farmer or other informant
M	information from Hull Museum site index or collection
GW	grid walked
LW	line walked
EXC	excavation
LM	information from Loughlin and Miller 1979
S	walked by the author alone

Aerial photos:

NMR	National Archaeological Record, Swindon
DU	Photos by the authors held at Durham University
CU	Cambridge University Committee for Aerial Photography
CPD	County Planning Department, Beverley
PH	Peter Halkon

Type of site:

I+	major iron-working site
I	iron-working evidence
*	kiln site
*?	possible kiln site
S	probable settlement site
S?	small scatter of sherds, possible settlement site

Postscript

In August 1996, after the text of this volume was completed, a watching-brief by John Tibbles of Humber Archaeology Partnership at Skiff Lane (SE 829358) resulted in the discovery of another kiln which was subsequently excavated by Rodney Mackey and the East Riding Archaeological Society. A full report on this excavation will appear elsewhere.

Gazetteer

Site number	*Museum accession no.*	*Site name*	*Map reference (SE)*	*Soil type*	*Distance from water (m)*	*Method of discovery*	*Aerial photos (SE)*	*Site type*	*Other details*
1	KINCM 7.1986	Arglam Grange	782354	HMC	250	LW; LM	7835/4/579/80 NMR	I+; S?	Scatter of sherds and burnt stone coinciding with two groups of ditch systems. Large amounts of iron slag. Spread of material *c.* 25m sq.
2	KINCM 7.1986	Arglam Grange	778354	HMC	25	LW; LM	DU 1986	S?; I	Concentration of sherds, some slag and oyster shell on sand ridge sloping down to peat level. Spread of material *c.* 30m sq. Dating from pottery, 2nd-late 4th century A.D.
3	KINCM 7.1986	Arglam Grange	780352	HMC	100	LW; LM		S	Scatter of sherds on sand ridge. Spread of material *c.* 15 m sq.
4	KINCM 7.1986	Beacon Farm	831383	HMC	50	GW; IF	NMR 8338 880 42/46	S?	Concentration of sherds on sandy plateau with a large number of burnt stones; site associated with site 89. Spread of material *c.* 600m sq.
5		Beacon Farm	83053808	HMC	25	IF	NMR	S?	Sherds reported at this grid reference by farmer, coinciding with square ditched enclosure.
6	KINCM 17.1966	Black Plantation	792368	HMC	200	M		*?	Romano-British pottery found at Blackwood whilst digging a ditch out.
7		Bursea Grange	81503416	PC	250	S; M	NMR 8134 879/29	S?	Scatter of sherds and burnt stone *c.* 30m sq. [Note KINCM 1182.1983. Several grey-ware jars from Mortimer Collection found at this farm.]
8		Bursea Grange	812341	HMC	300	S	NMR 8133/1 /98; PH	*?	Pottery reported by Mr W. Halkon, 1970, some wasters. Scatter of sherds and kiln material coinciding with square enclosures. Spread of material *c.* 20m sq.
9		Bursea Grange	813344	HMC	625	S	8134/7/58	S	Scatter of burnt stone and small sherds of pottery on sand ridge near a square ditched enclosure. Spread of material *c.* 20m sq.
10		Bursea Grange	812342	HMC	500	S		S?	Small scatter of sherds on sand ridge. Spread of material *c.* 5m sq.
11	KINCM 6.1986	Bursea House	81303372	HMC	25	IF		*?	Large quantity of sherds found by farmer during the renovation of a arm building. Kiln material and burnt cobbles recovered at a depth of *c.* 0.70m. Site now buried under a concrete floor. Dating from pottery, 2nd - early 4th century A.D. (Halkon 1983, site B1).
12	KINCM 6.1986	Bursea House	81293369	HMC	25	IF		S	The greater part of a Huntcliff-type pot plus sherds of two other similar vessels found by farmer when digging a new post hole for pig shed door (Halkon 1983 site B2, fig. p. 17).

Site number	*Museum accession no.*	*Site name*	*Map reference (SE)*	*Soil type*	*Distance from water (m)*	*Method of discovery*	*Aerial photos (SE)*	*Site type*	*Other details*
13	KINCM 6.1986; KINCM 6.1970	Bursea House	81253366	HMC	25	IF; M; LW		S	A large quantity of Romano-British sherds and burnt stone were found when a drainage ditch was dug in 1970. The profile of two ditches were seen in the side of the drain and contained some pottery (Halkon 1983, 18). Another ditch was found in the drain, 17/4/86. When line-walked a concentration of sherds and burnt stone found in the north-east corner of field at highest point. Spread of material *c.* 900m sq.; geophysical survey (Pocock 1986; see also Swan 1984, fiche 5.679).
14	KINCM 6.1986; KINCM 25.1963	Bursea House	813338	HMC	75	IF; GW; EXC	AX 1 25 PA; CU; PH	*; I+	Large quantities of sherds, kiln material and burnt stone first noticed in 1963. Field-walking and geophysical surveying conducted (Pocock 1982; Halkon 1983, site B4). Glass slag fragments, iron slag and a spindle whorl collected. For excavation see below 5.3. Dating from pottery, 1st to 4th centuries A.D. (see also Swan 1984, fiche 5.679-80).
15	KINCM 6.1986; KINCM 25.1963	Bursea House	81353375	HMC	100	S; IF; EXC		*	Several kiln bars, kiln material and sherds collected in raspberry patch. Geophysical survey by Pocock 1982. Spread of material *c.* 40m sq. For excavation see below 5.3.
16	KINCM 25.1963	Bursea House	81303368	HMC	50	IF; S		S; I	Large quantities of sherds, iron slag and glass slag in the garden of the house (Halkon 1983, site B5).
17	KINCM 6.1986	Bursea House	81153302	HMC	25	IF; S		S?	Light blue/green glass bangle (below 5.4.3) and the base of a pot decorated with stamp. Whole profile of dish type D1a (Halkon 1983, 20 site B8).
18	KINCM 6.1986	Bursea House	81203335	HMC	25	S	NMR 879/40 885	S?; I	Scatter of burnt cobbles and sherds on sand ridge, coinciding with rectilinear enclosures on aerial photograph. Site near ancient bank of previous course of the river Foulness. Spread of material *c.* 400m sq.
19	KINCM 6.1986	Bursea House	813335	HMC	25	S		S?	Scatter of sherds on small sandy rise which may have been on island in the river. Spread of material *c.* 20m sq.
20		Common Farm, Arglam	78853660	Na	250	M; EXC	DU 1986; NMR 7836/4/384	*	Romano-British 3rd or 4th century kiln excavated by Mr E. Greenfield 1942-43 (unpublished; see Swan 1984, 150). Sherds also collected by Mr W. Halkon, 1970 (see also Swan 1984, fiche, 5.681).
21		Common Farm, Arglam	78953670	Na	325	IF	DU 1986; NMR 7836/4/384; CU 2 x 57	S?	Greyware dish, burnished, waster, discovered during drainage in the 1930s.

Site number	*Museum accession no.*	*Site name*	*Map reference (SE)*	*Soil type*	*Distance from water (m)*	*Method of discovery*	*Aerial photos (SE)*	*Site type*	*Other details*
22		East Bursea Farm	80853355	HMC	125	LW; EXC	NMR 8033 879/41	S?; I	Stone, slag, burnt cobble and sherds of Romano-British pottery collected in area of a hut circle on aerial photographic site on sand plateau (see 3.1).
23		East Bursea Farm	81103330	HMC	50	LW	NMR 8133 879/41	S?	Burnt stone, oyster shell and sherds associated with site 18, collected in area of square enclosure showing on aerial photograph. Scatter of material *c.* 50m sq.
24		East Bursea Farm	80963338	HMC	50	LW	NMR 8033 879/42	S?	Scatter of sherds on sand ridge coinciding with settlement features on aerial photograph.
25		East Bursea Farm	80853340	HMC	75	LW	NMR 879/42	S?	Small scatter of sherds and burnt stone over an area of *c.* 20m sq. coinciding with possible settlement features on aerial photograph.
26		East Bursea Farm	80903330	HMC	50	LW	NMR 879/42	S?	Small scatter of sherds and burnt stone over an area of *c.* 20m sq. coinciding with settlement features on aerial photgraph.
27		East Bursea Farm (Chapel Field)	80603392	HMC	125	GW	DU 1986	S; I	High sand plateau with scatter of sherds and iron slag. Romano-British material appeared to be in *c.* 100m sq. spread on north-east edge of the plateau away from the main medieval chapel site (Pocock 1982). Dating from pottery 2nd to late 4th century A.D.
28		East Bursea Farm	808332	HMC	75	IF	RAF vertical	*?	Polygonal enclosure with one or more possible hut circles outside (Loughlin and Miller 1979, 42). Farmer reported finding kiln material and wasters at this location on a sand ridge (Swan 1984,fiche, 5.679).
29	KINCM 79.1986	Fir Tree Farm	78613310	HMC	250	S		S?; I	Scatter of sherds and burnt stone over an area of *c.* 50m sq. on sandy ridge. The farmer reported an old story of a trackway running across the field.
30	KINCM 76.1986	Forest Field, Skiff Farm	81953618	HMC	25	GW	NMR 8136 880/41	S?; I	A large number of burnt stones and a few sherds of pottery and pieces of slag in area of rectilinear enclosures showing on aerial photograph. Geophysical survey conducted by Mr J. Pocock. Spread of material *c.* 200m sq.
31	KINCM 5.1986	Hasholme Grange	827329	HMC	50	S	NMR 8232 879/38	S	Sherds and burnt cobble coincidental with a ring ditch showing on the aerial photographic site on sand plateau.
32	KINCM 5.1986	Hasholme Grange	82453294	HMC	25	S	NMR 8232 879/31	S?; I	A small scatter of sherds of Romano-British pottery and one possible Iron Age sherd in area of complex of enclosures showing on aerial photographs.
33	KINCM 5.1986	Hasholme Grange	82703300	HMC	50	S	NMR 8232 879/33	S?	Areas of burnt stone and a few Romano-British sherds in the area of a series of large rectilinear enclosures shown on aerial photographs.

Site number	*Museum accession no.*	*Site name*	*Map reference (SE)*	*Soil type*	*Distance from water (m)*	*Method of discovery*	*Aerial photos (SE)*	*Site type*	*Other details*
34	KINCM 5.1986	Hasholme Grange	82433271	HMC	25	S	NMR 8232 993/15	S?; I	Burnt stone and a few Romano-British sherds on the slopes of the sandy rise, coinciding with enclosures and other features showing on aerial photographs.
35	KINCM 5.1986	Hasholme Grange	82563280	HMC	25	S	NMR 8232 879/38	S?	Major complex of enclosures, trackways and hut circles showing on aerial photographs. A scatter of burnt stone, sherds and oyster shell found in area of these features over an area of *c.* 200m sq.
36	KINCM 5.1986	Hasholme Grange	83013275	HMC	125	S	NMR 8332 879/33/933/15 /2/227; DU 2/2224	S?	Large square double ditched enclosures with adjoining trackways, on top of sand ridge, showing on aerial photographs. Sherds and burnt stone were found in area of these features.
37(a)	KINCM 25.1963	Hasholme Hall (Pot field)	823328	HMC	100	EXC; GW	CU ZX 53	*; I+	Romano-British sherds first recognized by Mr W. Halkon in 1957. Small trench dug by Mr Skinner of Market Weighton School, 1963. Excavation of several kilns by E.R.A.S. 1970-72 (Hicks and Wilson 1974). Geophysical surveying carried out by Mr J. Pocock in conjunction with grid walking by E.R.A.S. (Halkon 1983). See below 5.2.
37(b)	KINCM 57.1970; KINCM 13.1972	Hasholme Excavation	823328	HMC	100	EXC; GW	CU ZX 53	*; I+	Spread of iron slag, sherds and burnt stone *c.* 4000m sq. on sand plateau. This coincides with hut circle and enclosure features showing on aerial photographs and features sampled during drainage works in August 1984. Dating Iron Age to early 4th century A.D. See below 5.2 (see also Swan 1984, fiche, 5.678).
38		Hasholme Hall (Pot field)	82253276	HMC	25	LW	CU ZX 53	*?; I	Scatter of sherds, concentration of iron slag, kiln material and two late Roman coins (one Radiate, one House of Constantine (FEL TEMP REP)) over an area of *c.*150m sq. on the slope of a sand rise near creek system.
39		Hasholme Hall (Pot field)	82453350	HMC	25	LW	NMR 8133/1/102	S	Small scatter of Romano-British sherds and some burnt stone over an area of *c.* 30m sq. on an 'island' of sand to the east of Fox Covert plantation. Traces of a square ditched enclosure show on aerial photograph. Ditch profiles seen during drainage.
40		Hasholme Hall	82873370	HMC	25	LW	NMR 8233/2/323	S?	Scatters of burnt stone and a few sherds of pottery on a series of low sandy hills known as 'Hasholme Hills'. Area of scatters *c.* 30m sq.
41		Hasholme Hall	82453397	PC	125	LW			Barbarous Radiate coin.

Site number	*Museum accession no.*	*Site name*	*Map reference (SE)*	*Soil type*	*Distance from water (m)*	*Method of discovery*	*Aerial photos (SE)*	*Site type*	*Other details*
42	KINCM 13.1986	Highgate	826373	WC	250	S; IF	NMR 8237/880/42	S?; I	Romano-British sherds, oyster shell and burnt stone in scatter over *c.* 100m sq. Mr Oxtoby reported that finds of pottery used to be more common. The site is on the break in soil between Mercia Mudstone and HMC. There are gypsum beds nearby.
43	KINCM 7.1986	Holme House	774368	PC	25	LW; IF; EX		*?; I	Large quantity of sherds, kiln material, burnt stone on low sand ridge branching off from Ragdale Hills, material spread over *c.* 2000m sq. Ditch profile containing Romano-British pottery cleaned and drawn in western section of Foss Dyke drain. Dating from pottery, 2nd to late 4th century A.D.
44	KINCM 7.1986	Holme House	787372	HMC	25	LW	DU 2/15; 17; DU 2/21; NMR 7837 31416	S	Major complex of enclosures, hut circles, trackways and fields show on aerial photographs. Field now direct drilled, however, some sherds and burnt cobble collected in area of enclosures.
45	KINCM 12.1986	Ladies Parlour (Parlour Farm)	82753621	HMC	25	GW		*	A very large concentration of Romano-British sherds and kiln material *c.* 300m sq. on sand 'plateau'. Dating from pottery, later 3rd to later 4th century A.D.
46	KINCM 11.1986	Landing Farm	84293625	HMC	25	S; IF		*	Large number of sherds, burnt stone and kiln material scattered over *c.* 400m sq. The topsoil was noticeably darker in this area. Dating from pottery, 2nd to early 4th century A.D.
47	KINCM 14.1986	Lodge Farm	804362	PC	625	S; IF		*?	Kiln site directly opposite site 56 known since 1950s. A complete vessel found during drainage at this time. Kiln material, sherds and burnt stone in 400m sq. concentration.
48	KINCM 14.1986	Lodge Farm	80403640	PC	500	S		S?	A small scatter of sherds and burnt cobble, over area of *c.* 100m sq. perhaps a settlement site associated with site 47.
49	KINCM 14.1986	Lodge Farm	80053582	HMC	1125	S		S?	Scatter of sherds, burnt cobble, oyster shell and bone on slight rise in a clay area. Spread of material *c.* 40m sq.
50	KINCM 14.1986	Lodge Farm	80173583	FC	1250	S	NMR 8035/3 356-7	S?	Small concentration of sherds *c.* 20m sq. on a slight rise. This inside hut circle and multiple square enclosure feature on aerial photograph.
51		Marl Pits Farm	78653839	HMC	25	M; IF		I; *?	The farmer reported finding sherds of Romano-British pottery; A curious waster 'lid' found north of the farm house. Pieces of iron slag and burnt stone were found on the banks of an old branch of the river Foulness. (see Swan 1984, 5.681).

Site number	*Museum accession no.*	*Site name*	*Map reference (SE)*	*Soil type*	*Distance from water (m)*	*Method of discovery*	*Aerial photos (SE)*	*Site type*	*Other details*
52	KINCM 10.1986	Monk Farm	78553755	FC	25	S	NMR 7837 2 31	*?	A concentration of waster sherds and kiln material spread over an area of *c.* 1000m sq. in field immediately to the east of medieval moated site. Aerial photograph shows poor crop growth in this area. Dating from pottery, 2nd to early 4th century A.D.
53	KINCM 10.1986	Monk Farm	78653865	HMC	200	S		S?	A small scatter of Romano-British sherds on a sandy ridge *c.* 20m sq.
54		Park Farm	81463910	HMC	500	IF; S		S?	Romano-British sherds found during the laying of a gas main. Further pottery was collected when the site was visited. Dating from pottery, later 3rd to later 4th century A.D.
55	KINCM Rack 38	Prospect Farm	805364	PC	500	IF; S; EXC		*	Site reported by Mr G. Morton of Hasholme Carr Farm, Autumn 1983 (55a). Large spread of Romano-British sherds on a slight sandy rise in the corner of the field over *c.* 2000m sq., field-walked by author (55b). In October 1985 drainage carried out by Lightowlers Drainage Company revealed some ditch profiles and a possible stoke pit in the corner of the field. Large quantities of sherds were found in the drainage soil (55c). Dating from pottery, 2nd to late 4th century A.D.
56	KINCM 16.1986	Rose Villa	80453617	FC	700	IF; GW		*	Mr Brown reported finding Romano-British. sherds in the corner of the field and also under grass in front of the house. The site was grid walked and large quantities of sherds, kiln material and burnt stone were collected on a slight rise. Spread of material *c.* 400m sq. (see site 47). Dating from pottery, later 3rd to later 4th century A.D.
57		Rose Villa	80353620	FC		IF		S?	Farmer reported finding a Roman coin at this location, now lost.
58		Runner End Farm (The Homelands)	80413835	HMC	25	IF		*	Roman pottery was reported at this farm and material collected by pupils from Holme County Primary School and examined by author. Some kiln material and several wasters were included. This site was also a later medieval kiln site.
59	KINCM 78.1986	Sand Hill Farm	79423580	HMC	875	IF; GW	PH	*	Roman pottery had been found by the farmer for many years at this location. Kiln material and a large number of sherds were collected in an area 100m sq. on a slight rise. Dating from pottery, later 3rd to later 4th century A.D.
60	KINCM 78.1986	Sand Hill Farm	79523589	HMC	1125	S		S?	A small scatter of sherds found over a 20m sq. area on the top of a sandy hill.

Site number	*Museum accession no.*	*Site name*	*Map reference (SE)*	*Soil type*	*Distance from water (m)*	*Method of discovery*	*Aerial photos (SE)*	*Site type*	*Other details*
61		Seaton New Hall	78923925	Na	25	IF; LW		S?	A few sherds of pottery found on a sandy hill.
62		Seaton New Hall	78553920	FC	150	LW		*?	A concentration of pottery (some wasters) and baked clay about 400m sq. on edges of clayey and sandy soil.
63		Seaton Old Hall	77773945	PC	100	IF		*	Former farmer found a large quantity of Romano-British sherds and kiln material during the potato harvest. This was inspected by the author. When the site was walked, nothing was seen on the surface of the field. Dating from pottery, 3rd to later 4th century A.D.
64	KINCM 12.1986	Skiff Lane (Parlour Farm)	816375	HMC	75	S	DU 1983	S?; I	A scatter of large cobbles (some burnt), Romano-British sherds, slag and oystershell *c.* 100m sq. in area. This coincided with a series of trackways showing as cropmarks.
65	KINCM 29.1986	Skiff Farm	82383670	WC	25	LW; IF		S?	Farmer reported finding Romano-British sherds near an old World War 2 bomb store. Some sherds of pottery collected on field edge, but it was impossible to ascertain the full extent of the site.
66	KINCM 29.1986	Skiff Farm	82453664	HMC	125	LW	NMR 8236 1;4	S?	Scatter of Romano-British sherds on a sand ridge, coinciding with enclosures and hut circles showing as cropmarks on the aerial photographs. Spread of material *c.* 50m sq.
67	KINCM 29.1986	Skiff Farm	82713624	HMC		LW		S?	Small scatter of sherds *c.* 20m sq. on a sand ridge.
68	KINCM 29.1986	Skiff Farm	828368	HMC	250	LW		S?	Small scatter of sherds *c.* 20m sq on a sand ridge.
69	KINCM 29.1986	Skiff Farm	82603715	WC	250	LW		S?	Small scatter of sherds and burnt stone on the break between sandy soil and Mercia Mudstone.
70	KINCM 29.1986	Skiff Farm	82413646	HMC	250	M		*?	Roman pottery, probably from a kiln reported by Mr C. Saxton of St William's School, Market Weighton, January 1969, near this location (see site 95). When field-walked only a few sherds were collected. Much of area now under farm tracks and buildings.
71	KINCM 29.1986	Skiff Farm	82703635	HMC	100	LW		S?	Noticeable soil marks showing up in the field on the same sand ridge as site 45. Some sherds and burnt stone found in this area.
72	KINCM 29.1986	Skiff Farm	82603636	HMC	200	LW		S?	Sherds in the west corner of the field on a sandy rise.
73		Sotheron's Plantation	80873595	PC	875	IF	NMR 8035/1/96	*?	Kiln site reported by Mr G. Morton, who noticed a large number of sherds and some kiln material.

Site number	*Museum accession no.*	*Site name*	*Map reference (SE)*	*Soil type*	*Distance from water (m)*	*Method of discovery*	*Aerial photos (SE)*	*Site type*	*Other details*
74	KINCM 53.1962	Throlam Farm	821355	HMC	375	M	NMR 8235 874/12 880/40	*	(a) Pot Hill. Site first discovered in 1920s (Corder 1930). In March 1964, the mound of wasters was still over 1.22m high. Bronze coin of Magnentius on surface of the mound. In March 1965, the mound only 1m high (Hull Museum Site Index; Loughlin and Miller 1979, 42). Material collected by J.D. Hicks and B. Lavin in February 1970. (b) When visited by the author the mound was still very visible, but now less than 0.5m high. A large number of sherds, some large, as well as kiln material could be seen. A large complex of enclosures and buildings showed on aerial photographs. Dating from pottery, later 3rd to later 4th century A.D. (Swan1984, fiche 5.682-3).
75		Throlam Farm	820356	HMC	375	S	NMR 8235 874/12 880/40	*?	Large scatter of Romano-British sherds in an area discrete from site 74. This material spread over *c.* 500m sq. coincided with a series of enclosures and buildings on aerial photographs (see Loughlin and Miller 1979).
76		Bramley Farm	81803577	HMC	300	S		*?	Large number of Romano-British sherds and burnt cobble on a sandy rise to the north of the field.
77		Throlam Farm	820357	HMC	300	HM; EXC; LM	see site 74	*	Site of the kilns excavated by Corder (1930). In 1964 these were still extant as slight rises and pottery scatters. By March 1965, they had been incorporated into a piggery (Loughlin and Miller 1979, 42; Swan 1984, fiche 5.682-3).
78		Tollingham Farm	83633580	HMC	125	IF; S		*	Large numbers of sherds were found in the mole hills in the pasture adjacent to the farm house. There were also some burnt stones and kiln material.
79		Tollingham Farm	83053645	HMC	50	S		S?	Area of burnt stone and Romano-British sherds on a sand rise to the north of the marl pit. Spread of material *c.* 400m sq.
80		Tollingham Farm	83853550	HMC	150	S	NMR 8353 283/106	S?	Scatter of sherds of Romano-British pottery and burnt cobble on a sandy rise.
81		Tollingham Farm	83993555	HMC	100	S	NMR 8353 106 993/7 1042/12	S	Burnt stone and Romano-British sherds on the site of an enclosure appearing on the aerial photographs.
82		Tollingham (Clay Hill)	83353550	HMC	25	S		*?	A large number of Romano-British sherds on the top of a sand ridge, 100m north of Skiff Lane, adjacent to site 78.

Site number	*Museum accession no.*	*Site name*	*Map reference (SE)*	*Soil type*	*Distance from water (m)*	*Method of discovery*	*Aerial photos (SE)*	*Site type*	*Other details*
83	1002-1942/7	Tollingham Farm	830356	HMC	375	M; LM		*?	Greyware bowls (and many others which have not survived) found 1873-74. Sharply carinated greyware bowl found on the site of the airfield in 1940. The site was also visited in March 1964 by Mr G.M. Pidgeon who described a large number of sherds to the west of the large aircraft buildings (also see Loughlin and Miller 1979, 42-43; Swan 1984, fiche, 5.683).
84		Tollingham Farm	832355	HMC	150	LM		*	Remains of Romano-British pottery kiln material and many coarse ware wasters found in 1967 (Loughlin and Miller 1979, 42-43; Swan 1984, fiche 5.684).
85		Tollingham Farm	829355	HMC	450	M		*?	Many coarse ware wasters found here in 1967 by J. Bartlett of Hull Museum (Swan 1984, fiche 5.684).
86		Warham Farm	78953380	HMC	750	LW	CPD	S?; I	A scatter of sherds and burnt stones on a sand ridge in area of possible enclosure with a trackway. Material spread over *c.* 100m sq.
87(a)	KINCM 61.1970	Welham Bridge Farm	795348	HMC	500	IF; LW; M; GW	PH	*I+	A large number of sherds, kiln material and burnt stone collected by E.R.A.S.
87(b)	KINCM 3.1986	Welham Bridge Farm	795348	HMC	500	IF; LW; M; GW		*I+	A large amount of the same material was found covering a spread of *c.* 2000m sq. during field-walking by evening class group accompanied by Mr C. Dunn of R.C.H.M. York. Dating from pottery, 2nd to late 4th century A.D. (Swan 1984, fiche, 5.681).
88	KINCM 61a.1970	Welham Bridge Farm	794348	HMC	450	M			A complete carinated decorated bowl found by the farmer during drainage.
89	KINCM 4.1986	Woodlands Farm	83153839	HMC	100	LW; GW	NMR 8338 2/32, 34	S; I	Large quantities of sherds, burnt stone and slag over an area of *c.* 1500m sq. coinciding with enclosures and hut circles on aerial photographs. The site was situated on a sandy plateau. Previous to field-walking, ditches could be seen in enhanced growth of sugar beet crop. Dating from pottery, 2nd to late 4th century A.D.
90		Johnson's Farm	77753462	FC	25	LW		S?	Scatter of sherds, around 30m sq., on higher areas of clayey field near a wide area of carr land.
91		Johnson's Farm	77803458	FC	150	LW		S?	Scatter of sherds, around 30m sq., on higher areas of clayey field near a wide area of carr land.
92		Johnson's Farm	77953460	FC	100	LW		S?	Scatter of sherds, around 30m sq., on higher areas of clayey field near a wide area of carr land.
93		Common Farm Arglam	785361	Na	25	IF; M	see site 20	*?	Sherds of greyware pottery and kiln material reported at this site by Mr W. Halkon in 1971.
94		Spen Farm	80573885	HMC	250	S		S?	A small scatter of sherds *c.* 25m sq. found on a sandy ridge.

Site number	*Museum accession no.*	*Site name*	*Map reference (SE)*	*Soil type*	*Distance from water (m)*	*Method of discovery*	*Aerial photos (SE)*	*Site type*	*Other details*
95	KINCM 1.69	Skiff Farm	82483650	HMC	200	M		*?	A kiln site reported by Mr Saxton of St William's College, Market Weighton (see site 70; Swan 1984, fiche, 5.684). Dating from pottery, later 3rd to later 4th century A.D.
96	KINCM 29.1986	Skiff Farm	822350	HMC	125	LW		S?	(See sites 64-71). Several sherds in area of enclosures and hut circles showing as cropmarks on aerial photograph; site situated on a sandy ridge.
97	KINCM 29.1986	Skiff Farm	82873675	HMC	150	LW		S?	Sherds of pottery on sandy rise with some burnt stone.
98	KINCM 29.1986	Skiff Farm	827370	WC	400	LW		I; S?	Sherds of Romano-British pottery on the edge of Mercia Mudstone as it rises to form Church Hill. Some slag also.
99	KINCM 29.1986	Skiff Farm	82793648	HMC	50	LW		S?	Some burnt stone and a sherd of Romano-British pottery.
100	KINCM 29.1986	Skiff Farm	828370	HMC	300	LW		S?	Three sherds of pottery on a sandy rise.
101	KINCM 29.1986	Skiff Farm	82803648	HMC	75	LW		S?	Sherds of Romano-British pottery and burnt stone in field immediately to the north of Ladies Parlour kiln site, on a sandy ridge.
102		Wholsea Farm	84353265	HMC	50	S		S?	Very worn and corroded late Roman coin found on the edge of a sandy ridge. Since the coin was found the farmer has reported the discovery of sherds of Roman pottery on the farm, although their precise find-spot is unknown.
103		Chestnut Farm	78803356	HMC	150	IF		S?	Greyware pottery found by farmer on sandy ridge. Could be associated with site 86.
104		Fir Tree Farm	77953356	HMC	300	IF; EXC		S	The farmer reported the discovery of pottery during land drainage. Members of E.R.A.S. undertook clearing and drawing of a ditch profile in the section of the new drain. This was full of pottery and several very decayed pieces of animal bone. Dating from pottery, 2nd to early 4th century A.D.
105		Welham Bridge West	788034	HMC	75	S		I+	Large quantities of iron slag and a few sherds of pottery found on a sandy ridge above a large area of peaty carr land.
106		Airfield Tollingham/ Throlam		HMC		IF		*	A very large number of sherds, reported by Mrs J. Wright of County Hall, Beverley, was found in a load of topsoil taken to Hutton Cranswick. The topsoil was acquired from Holme airfield. Information from Mr G. Watkin of the then Humberside Archaeology Unit. Dating from pottery, later 3rd to later 4th century A.D.
107		Bar Farm	82653965	HMC	100			I	Large furnace bottoms. Material concentrated on a sand ridge (one sherd of Romano-British pottery associated).
108		Beacon Farm	838377	EV	25			I+	Farmer reports finding iron slag '...so large that it took two people to lift.'

Site number	*Museum accession no.*	*Site name*	*Map reference (SE)*	*Soil type*	*Distance from water (m)*	*Method of discovery*	*Aerial photos (SE)*	*Site type*	*Other details*
109		Bursea Grange	817343	PC	50		NMR 8134 /642	I; S	Slag, burnt cobbles and some limestone found during field-walking in the area of an enclosure appearing on aerial photographs. For excavation see below 3.2
110		Bursea House	81403281	HMC	50			I+	On a sand rise near the river Foulness a concentration of large pieces of slag and furnace bottoms was found during field-walking (Halkon 1983, 19).
111		East Bursea Farm	806333	HMC	125			I+	A large concentration of iron slag and bowl shaped furnace bottoms was found on the lower slopes of a sand ridge close to the river Foulness.
112		East Bursea Farm	80763369	HMC	25			I	A scatter of material *c.* 100 m sq. consisting of small pieces of iron slag, cobble and medieval pottery, bone and oyster shell. On a ridge near the site of the deserted medieval village.
113		East Bursea Farm	807333	HMC	25			I+	Large pieces of iron slag and burnt cobble near a sand rise found in field-walking
114		East Bursea Farm	808332	HMC	125		RAF vertical	I	Iron slag in the area of a polygonal enclosure (listed by Loughlin and Miller 1979, 42) near the river Foulness.
115		East Bursea Farm	806335	HMC	25			I+	Large pieces of slag and bowl-shaped furnace bottoms, burnt cobble and limestone fragments found during potato harvest.
116		Hasholme Grange	824328	HMC	125			I+	A very large scatter of iron slag including, furnace bottoms, spread over *c.* 200m sq. (Halkon 1983, fig. 2.16). The material stopped abruptly on one side due to a possible boundary ditch. A cropmark of a square enclosure seen in 1984.
117		Hasholme Grange	82343265	HMC	25			I+	Concentration of iron slag on slopes of sand ridge in an area *c.* 25m sq. just above peat.
118		Hasholme Grange	82653270	HMC	25			I	Scatter of burnt stone with some slag on same sand ridge as site 117.
119		Hasholme Grange	82723269	HMC	25			I	Slag and burnt stone in th area of ring ditches seen as cropmarks.
120		Forest Farm	818363	HMC	25			I	Scatter of burnt cobble and slag on a slight rise.
121		Moore's Farm	79343408	FC	25			I+	Large slag heap found during field-walking. For excavation see below 4.2
122		Oak Farm	79103695	HMC	50		NMR 7936/1	I	Scatter of iron slag and burnt stone in area of cropmarks of consisting hut circles and enclosures.
123		Lincoln Flats	77983735	FC	25			I	Several bowl-shaped furnace bottoms on a sand ridge immediately above the flat expanse of peat near the river Foulness.

Site number	*Museum accession no.*	*Site name*	*Map reference (SE)*	*Soil type*	*Distance from water (m)*	*Method of discovery*	*Aerial photos (SE)*	*Site type*	*Other details*
124		Skiff Farm	827363	HMC	200			I	Scatter of slag in two sandy soil marks on top of a low ridge.
125		Sikes Farm	79503387	FC	25			I+	Farmer reported that large heaps of slag had been common in the area. Several had been removed. Some large bowl-shaped furnace bottoms were found in field-walking.
126		Welham Bridge West	78953450	HMC	25			I+	Large quantities of iron slag and saucer-shaped furnace bottoms *c.* 0.25m across found on the edge of the peat.
127		Welham Bridge West	79153445	HMC	25			I+	Large concentration of iron slag *c.* 100m across near an old branch of the river.
128		Welham Bridge West	79253451	HMC	150			I+	Large heap of iron slag and furnace bottoms near old branch of the river.
129		Welham Bridge Farm	79403420	HMC	25			I+	Large extent, *c.* 30m sq., of iron slag on a sandy ridge sloping towards the river.
130		Welham Bridge Farm	79603400	HMC	25			I	Large pieces of iron slag on a sand ridge near the river Foulness.
131		Wholsea	84203382	PC	150			I+	Large pieces of iron slag and saucer-shaped furnace bottom (cf. site 126), in an area about 100m sq. on the slope of a sand hill above a peat expanse.
132		East Bursea Farm	80103460	HMC	50			I	Large pieces of iron slag on sand ridge near the river Foulness.
133		Hasholme Carr Farm	83773346	HMC	25			I	Farmer reports finding iron slag on a sandy hill near a large area of peat.
134		Town Garth/Little End	810380	HMC	60	IF, GW	PH	S; I	Grid walking produced a substantial assemblage of pottery of 2nd-4th century covering an area *c.* 60 by 70m.
135		Arglam Grange Farm	777357	HMC		EXC		*	Rescue work in 1988 by Mr S. Harrison recorded a kiln exposed during drainage works.

Table 2.7

Pottery forms recovered from field-walked sites

	Gazetteer number:-															
Form	4	6	7	11	13	14	22/3	24	27	30	35	36	37a	37b	43	45
B1a	-	-	-	1	-	1	-	-	-	-	-	-	-	1	2	1
B1b	-	-	-	-	-	-	1	-	-	-	-	-	-	-	2	-
B1c	-	-	-	1	-	-	-	-	-	-	-	-	1	1	-	6
B1d	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-	-
B1e	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-
B1f	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
B1g	1	-	1	1	-	-	-	-	-	-	-	-	-	4	2	5
B1h	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1	6
B1i	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
B1j	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2a	-	-	-	1	-	-	-	-	1	-	-	-	1	2	-	1
B2b	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	3
B2c	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
B2d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
B2e	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1
B2f	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3a	-	-	-	1	-	-	-	-	-	1	-	-	-	1	-	3
B3b	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
B4a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B5a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B6a	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-
B6c	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7a	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
B8a	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	1
B8b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
B9a	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
B9b	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	1
B10a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B11a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B11b	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	1
B11c	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B12a	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
D1a	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-
D1b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D2a	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
D3a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D6a	-	-	-	-	2	1	-	-	-	-	-	-	-	2	2	-
D6b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D6c	-	-	-	-	-	1	-	-	2	-	-	-	-	-	-	-
D11a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D11b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F1a	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
F1b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F1c	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F1d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
F1e	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F2c	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F3a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
F3c	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F3e	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
F3g	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J1a	-	1	-	1	-	1	-	-	1	-	-	-	4	2	2	16
J1b	-	2	-	-	-	1	-	-	1	-	-	-	1	1	-	1
J1c	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
J1d	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1
J1e	-	3	-	-	-	-	-	-	1	-	-	-	1	-	1	1
J1f	1	-	-	-	-	2	-	-	-	-	-	-	-	-	2	2
J1g	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
J1h	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
J1i	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J2a	-	-	-	-	-	-	-	-	2	-	-	-	-	1	-	1
J2b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J3b	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	1

Table 2.7 (continued)

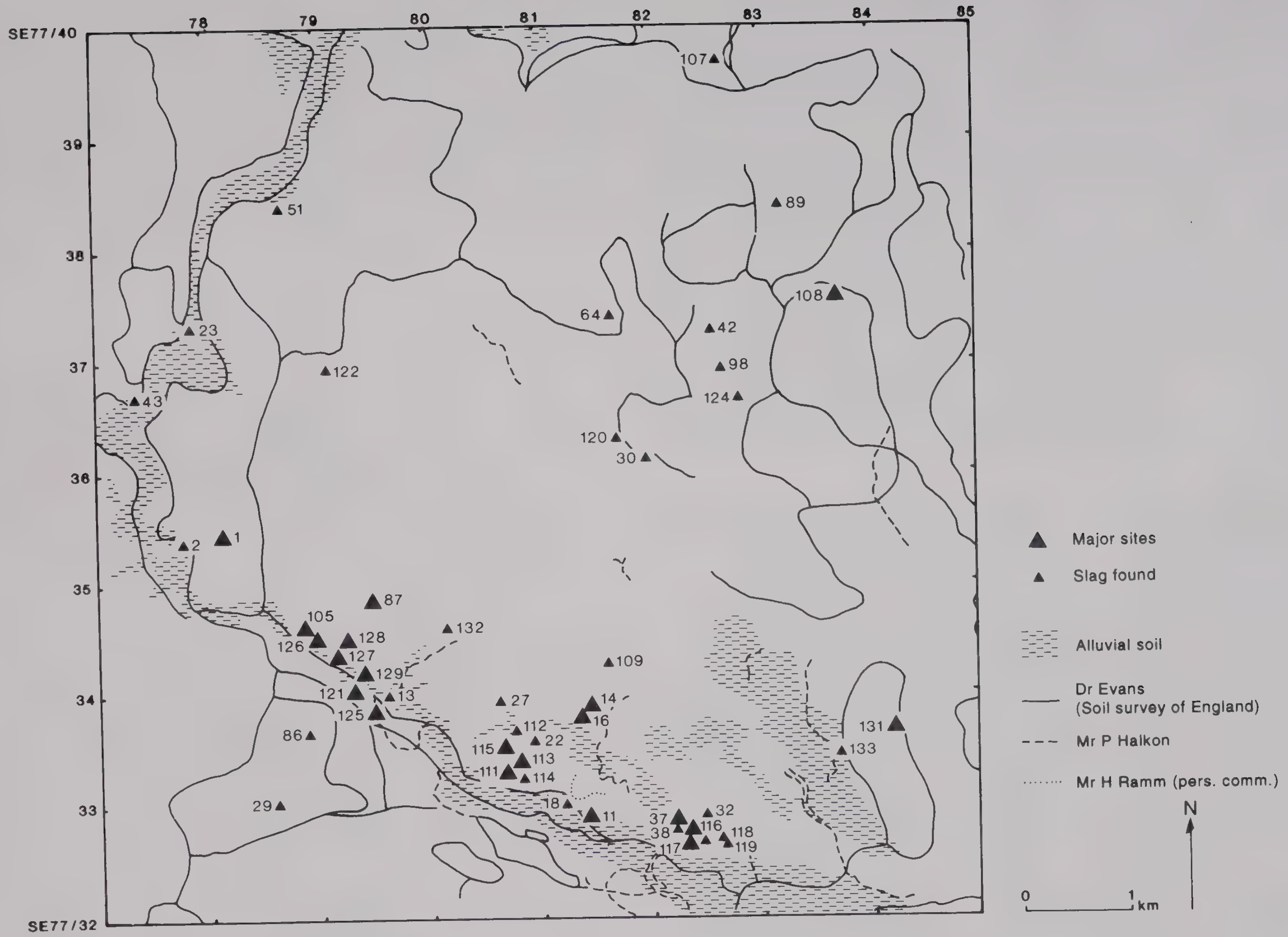
Pottery forms recovered from field-walked sites

	Gazetteer number:-															
Form	46	47	52	53	54	55a	55b	55c	56	59	61-2	63	68	74a	74b	76
B1a	-	-	2	-	-	-	-	6	-	2	-	5	1	1	-	-
B1b	–	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-
B1c	-	1	-	-	1	-	1	-	-	-	-	1	-	-	-	-
B1d	-	-	-	-	-	-	-	2	2	-	-	2	-	-	-	-
B1e	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-
B1f	-	-	-	-	-	-	-	-	-	5	-	3	-	-	-	-
B1g	-	1	-	-	-	-	-	-	1	4	-	5	-	1	1	-
B1h	-	-	-	-	1	-	-	-	-	2	-	-	-	-	1	-
B1i	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1j	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2a	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-
B2b	-	-	-	-	-	-	-	-	1	-	1	1	-	-	-	-
B2c	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2e	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
B2f	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3a	-	1	3	-	-	1	-	1	3	-	-	3	-	-	-	-
B3b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B4a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B5a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B6a	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-
B6c	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
B7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B8a	-	-	-	-	-	-	1	-	2	-	-	-	-	-	-	-
B8b	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-
B9a	-	1	-	-	-	-	-	-	1	1	-	1	-	-	-	-
B9b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B10a	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
B11a	-	-	-	-	-	-	-	-	1	3	-	-	-	1	-	-
B11b	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-
B11c	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
B12a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D1a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D1b	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D2a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D3a	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
D6a	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
D6b	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
D6c	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D11a	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
D11b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F1a	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
F1b	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
F1c	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
F1d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F1e	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F2c	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F3a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F3c	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F3e	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F3g	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-
J1a	-	1	3	1	-	1	3	1	36	3	2	2	-	1	3	-
J1b	-	-	-	-	-	1	-	-	3	-	-	1	-	1	-	-
J1c	-	-	-	-	-	-	-	-	-	3	1	1	-	1	3	-
J1d	-	-	1	-	-	-	-	1	1	3	-	1	-	1	-	-
J1e	-	1	-	-	-	-	-	-	-	1	-	1	-	1	-	-
J1f	-	-	1	-	-	-	-	-	-	5	-	-	-	-	-	-
J1g	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
J1h	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J1i	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-
J2a	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
J2b	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
J3b	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-

Table 2.7 (continued)

Pottery forms recovered from field-walked sites

	Gazetteer number:-													
Form	78	79	80	82	87a	87b	89	90/92	95	99	104	106	134	135
B1a	1	-	1	-	3	32	1	-	1	-	3	4	16	124
B1b	-	-	-	-	-	-	-	-	-	-	1	1	1	-
B1c	-	-	-	-	-	4	-	-	-	-	-	1	2	-
B1d	1	-	-	-	-	6	-	-	-	-	-	2	2	-
B1e	-	-	-	-	-	3	1	1	1	-	-	-	4	-
B1f	1	-	-	-	-	4	-	-	-	-	-	1	2	-
B1g	-	1	-	-	1	13	-	-	1	-	-	2	2	-
B1h	-	-	-	-	-	7	-	-	-	-	-	1	2	-
B1i	-	-	-	-	-	3	-	-	-	-	-	-	-	-
B1j	-	-	-	-	-	2	-	-	-	-	-	-	-	-
B2a	1	-	-	-	-	13	1	-	-	-	1	3	2	-
B2b	-	-	-	-	-	1	1	-	-	-	-	-	4	-
B2c	-	-	-	-	-	1	-	-	-	-	-	-	1	51
B2d	-	-	-	-	-	-	-	-	-	-	-	2	2	-
B2e	-	-	-	-	-	1	-	-	-	-	-	1	-	-
B2f	-	-	-	-	-	1	-	-	-	-	-	1	-	-
B3a	1	-	-	-	-	6	2	-	-	-	5	2	5	77
B3b	-	-	-	-	-	1	-	-	-	-	-	-	-	-
B4a	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B5a	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B6a	-	-	-	-	-	5	-	-	-	-	1	-	-	32
B6c	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7a	-	-	-	-	-	-2	-	-	-	-	-	-	-	-
B8a	-	-	-	-	-	1	-	-	-	-	1	1	2	-
B8b	-	-	1	-	-	-	-	-	-	-	-	3	-	-
B9a	1	-	-	-	-	9	-	-	1	-	-	6	-	-
B9b	-	-	-	-	-	-	-	-	-	-	-	2	2	-
B10a	-	-	-	-	-	2	-	-	-	-	-	-	-	-
B11a	-	-	-	-	-	1	-	-	-	-	-	1	-	-
B11b	-	-	-	-	-	2	-	-	-	-	-	1	-	-
B11c	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B12a	-	-	-	-	-		-	-	-	-	-	1	-	21
D1a	1	-	-	-	-	-		-	-	-	-	-	7	-
D1b	-	-	-	-	-	2	1	-	-	-	-	-	-	-
D2a	-	-	-	-	-	-	-	-	-	-	-	1	1	51
D3a	-	-	-	-	-	1	-	-	-	-	-	-	-	-
D6a	-	-	1	-	-	1	-	-	-	-	1	2	-	35
D6b	-	-	-	-	-	4	-	-	-	-	-	-	-	-
D6c	-	-	-	-	-	3	-	-	-	-	-	-	-	58
D11a	-	-	-	-	-	2	1	-	-	-	-	-	-	56
D11b	-	-	-	-	-	2	-	-	-	-	-	-	-	-
F1a	-	-	-	-	-	1	-	-	-	-	-	-	-	23
F1b	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F1c	-	-	-	-	-	1	-	-	-	-	-	-	-	-
F1d	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F1e	-	-	-	-	-	1	-	-	-	-	-	-	-	-
F2c	-	-	-	-	-	1	-	-	-	-	-	-	-	-
F3a	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F3c	-	-	-	-	-	1	1	-	-	-	1	-	-	10
F3e	-	-	-	-	-	2	-	-	-	-	-	2	-	-
F3g	-	-	-	-	-	3	-	-	-	-	-	-	-	-
J1a	1	-	-	-	1	25	2	-	-	-	4	15	16	164
J1b	-	-	-	-	-	-	-	-	-	-	-	1	1	73
J1c	-	-	-	-	-	1	-	-	-	-	-	-	-	-
J1d	-	-	-	-	-	1	-	-	-	-	-	-	-	-
J1e	-	-	-	-	-	6	-	-	-	-	-	1	-	74
J1f	-	-	-	1	-	1	1	-	-	-	-	3	-	-
J1g	-	-	-	-	-	1	-	-	-	-	-	-	-	-
J1h	-	-	-	-	-	2	-	-	-	-	-	-	-	-
J1i	-	-	-	-	-	2	-	-	-	-	-	-	-	-
J2a	-	-	-	-	-	-	-	-	1	1	-	-	-	221
J2b	-	-	-	-	-	1	-	-	-	-	-	-	-	-
J3b	-	-	-	-	-	-	-	-	-	-	-	-	1	1



Illus. 2.25 *Map showing the distribution of iron working sites located through field-walking. For identification of sites see Gazetteer*

2.4 Synthesis

The evidence presented in this chapter has shown very clearly how an intensive study of a limited area can provide good quality evidence about the intensity of Iron Age and Romano-British exploitation. Prior to the project, the area appeared as a blank on most distribution maps. It has now been demonstrated that the landscape was heavily exploited. The density of finds is probably not atypical of what might be found in other parts of the region if they too were subjected to the same intensity of study.

The aerial photographic evidence suggests that the area was densely exploited during the Iron Age. The earliest enclosures are simple ovoid or rectangular in plan. Field-walked finds of iron slag unassociated with Romano-British pottery are arguably of similar date (see below Chapter 4.4) and suggest large scale exploitation of iron in the region. The more complex aggregate cropmarks are those more commonly associated with Romano-British finds and their plans suggest that many developed slowly through time. These aerial photographic sites and those pottery scatters found through field-walking are demonstrably constrained by the marginal character of the landscape. In particular, sites show a strong preference for locations on the sandy ridges close to water courses. The layout of sites photographed from the air also suggests that they used waterways for access. The absence of large scale field-systems in the area perhaps indicates an economy which exploited other resources including woodland and pasture (see below Chapter 7.1).

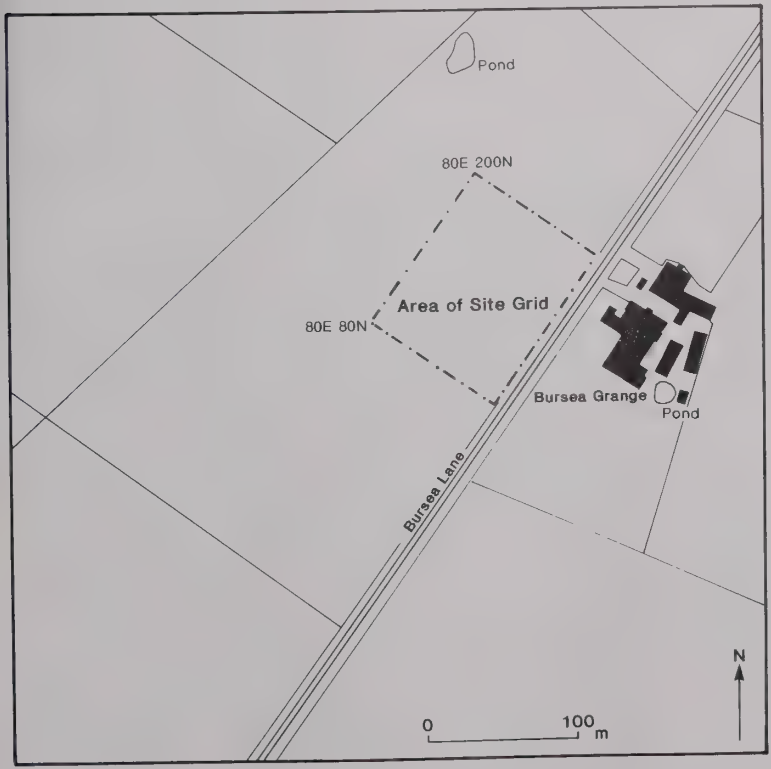
The dominant feature of the survey during the Romano-British period are its pottery kilns. These are widespread across the landscape block, and are often associated with other evidence of settlement. With the exception of Throlam (site 77), they do not appear to have been in production on a very large scale. Certainly, the huge waster heaps known from the Farnham/Alice Holt kilns (Lyne and Jefferies 1979) are unknown. This suggests a landscape where, although pottery production was important, it remained integrated with other aspects of settlement and economy. The presence of large quantities of Roman pottery within the survey area thus makes settlements visible but does create problems in determining which were the more important settlement sites. The ceramic evidence points towards occupation continuing into the later fourth century; after that the absence of datable finds and distinctive cropmark types has resulted in our survey failing to locate settlement. Given the high density of earlier activity it is doubtful whether this represents the real pattern.

CHAPTER 3

AGRICULTURAL SETTLEMENTS

3.1 Introduction

A number of the sites identified in the survey, by both aerial photography and field-walking, were associated with neither substantial scatters of iron slag nor Romano-British pottery. On morphological grounds a number appeared to be possible pre-Roman Iron Age agricultural settlements (above Chapter 2.2). Examples of two types of site, an unenclosed ring ditch and a simple rectangular enclosure, were sampled by excavation during the project with the aim of establishing their chronology and, if possible, reconstructing their economies. The two sites selected were a simple, apparently unenclosed ring ditch at East Bursea Farm and a rectangular enclosure with a ring ditch within at Bursea Grange. Thus an excavation at East Bursea Farm (Gazetteer no. 22) in 1985 was designed to cut a trench across a single round house noted on an aerial photograph (SE 80853355) but failed to locate any significant features. It was concluded at the time that the cropmark had not perhaps survived ploughing (Millett and Halkon 1986, 40). A review of the evidence since more precise plots of the aerial photographs have been produced suggests that our trench was misplaced so no conclusion can legitimately be drawn about the survival or otherwise of the round house.



Illus. 3.1 *Map showing the layout of the grid at Bursea Grange. For general location see Illus. 1.2*

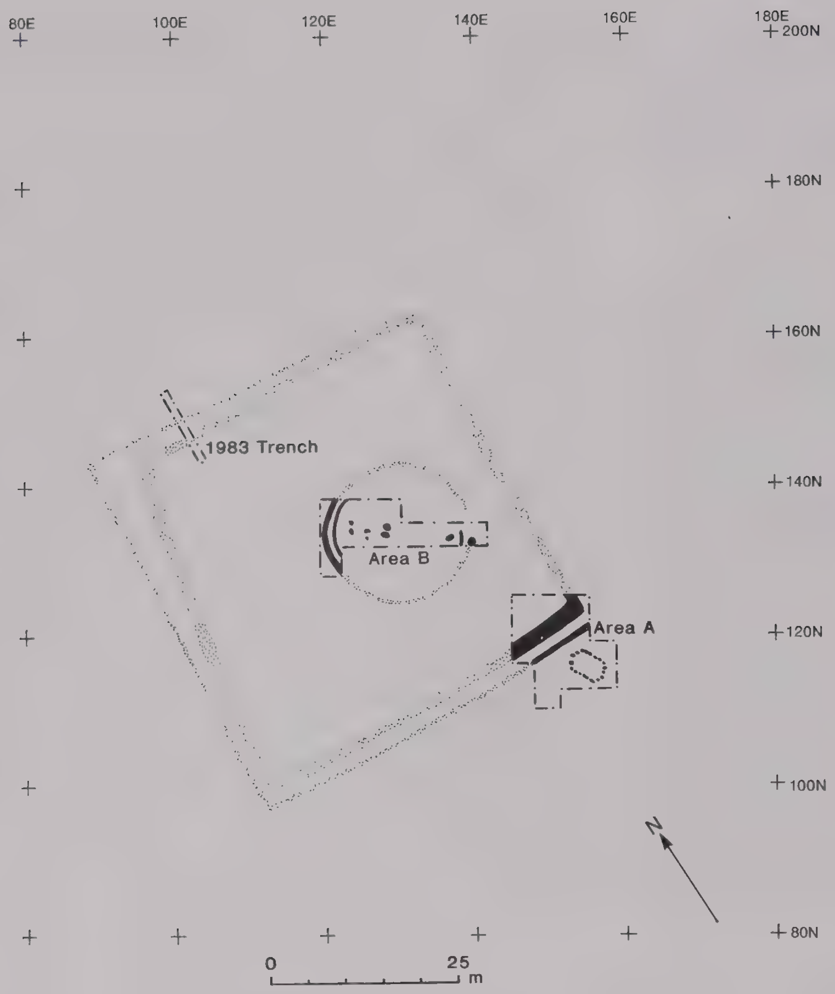
3.2 Excavations at Bursea Grange 1986

The site at Bursea Grange (SE 816343; Gazetteer no. 109) (Illus. 3.1) has been well-known through aerial photography for several years, being one of the few sites which is almost invariably visible as a cropmark (Illus. 2.18; above Section 2.2.3 and Illus. 2.14 no. 13). Indeed a high quality picture of it has been used by Riley in his text-book on aerial photography (Riley 1987, 111, pl. 80). A trench had been cut across the western side of the enclosure ditch by Tim Schadla-Hall and Peter Halkon in 1983 (Illus. 3.2). This had demonstrated that the ditches might be waterlogged. In 1986 it was therefore decided to examine the site further in the hope that it might be dated and that environmental samples collected would provide information about the agricultural economy. The excavation was undertaken in July 1986, largely using student labour. The site supervisors were Victoria Brandon, Spencer Carter, Keith Paulin and Steven Willis.

The site was situated on very low lying, flat land at between 4 and 5m O.D. on sands of the Everingham series, with the enclosure itself situated on a slight plateau of sand above the level of the Foggathorpe clay (cf. Illus. 2.11). Aerial photographs show that parts of the field in which the enclosure was located had once been occupied by the end of a creek (Illus. 2.18). A rectified plot of the best of the aerial photographs is presented in Illus. 3.2. In addition to various drainage features which have been omitted from the plot, the aerial photographs show the clear plan of the ditch of an almost square enclosure, *c.* 45m across, orientated north-south. There are also traces of a narrower but almost concentric ditch which appears to represent a palisade trench of another phase. This enclosure is slightly larger, with each side *c.* 50m in length, and was more nearly a perfect square. It may be noted that there is no unambiguous evidence for the location of any entrance to either enclosure. Within these enclosures, but offset slightly to the east of its centre, is a circular ring ditch with a diameter of *c.* 18m.

3.2.1 The excavation

Two areas were sampled by excavation (Illus. 3.2). Area A examined the south-east corner of the enclosure and was designed to examine both the enclosure ditch and the palisade trench observed on the aerial photographs. Area B was situated to section the ring ditch near the centre of the enclosure. Throughout the excavated area



Illus. 3.2 *Bursea Grange. Plan showing the trench layout*

the topsoil was removed by hand to the surface of the natural sand. This sand was eroded very easily by the wind and excavation was also made difficult by the presence of numerous mole holes, minor animal burrows, and linear plough-marks cut into the sub-soil. These intrusions are highly likely to have led to surface finds having been carried down with topsoil to contaminate the archaeological features.

Area A (Illus. 3.3)

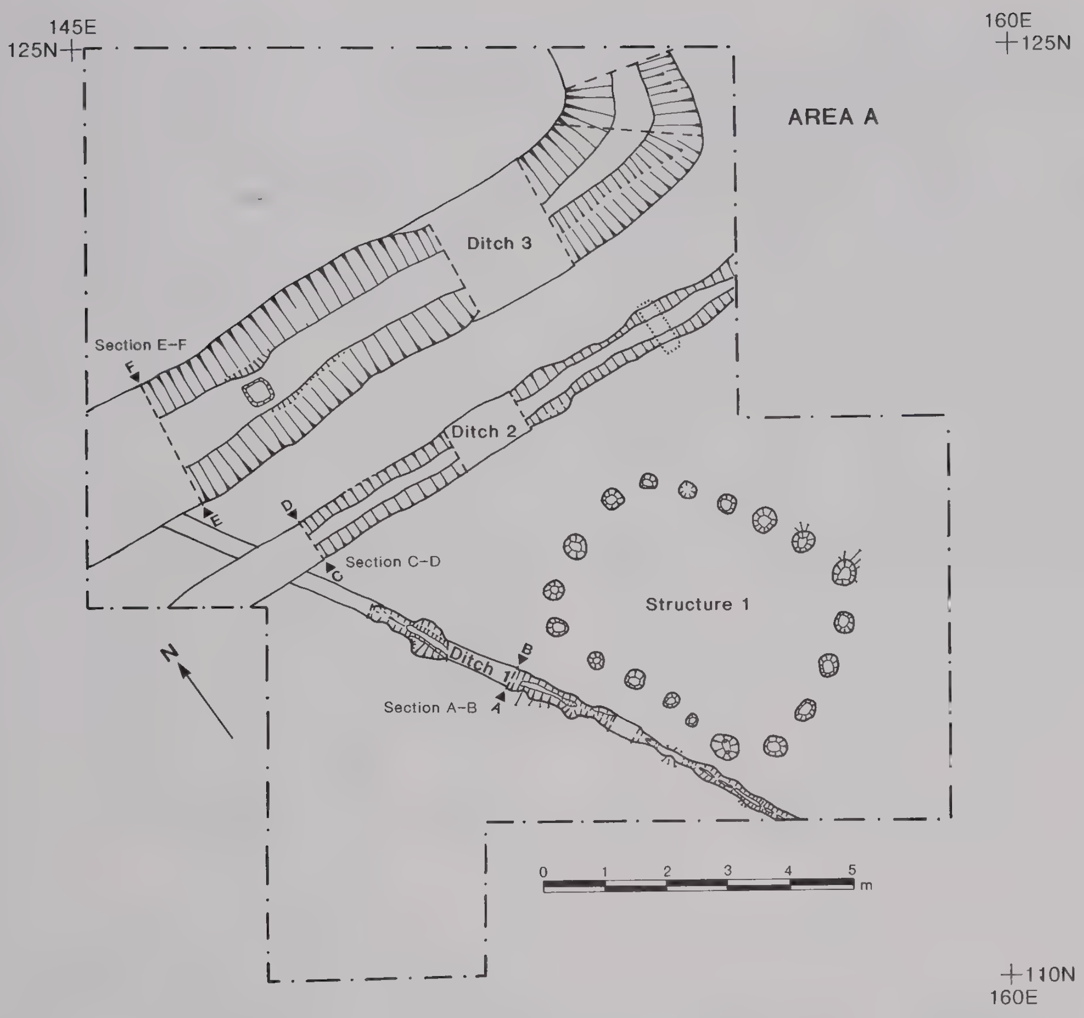
This trench was designed first to establish the relationship between the enclosure ditch and palisade trench, and second to sample for environmental evidence within the excavated ditches. The initial area opened revealed three post holes to the south of both enclosures (Ditches 2 and 3). The trench was therefore extended to examine the context of these features. This extension exposed the whole plan of a post-built structure (Structure 1) and an adjacent gully (Ditch 1).

The sequence revealed provides a clear phasing (Illus. 3.3). The two earliest features were Ditch 1 and Structure 1. They appear broadly contemporaneous as Ditch 1 is essentially parallel with the long axis of Structure 1. Ditch 1 was cut by both the principal enclosure ditch (Ditch 3) and the palisade trench (Ditch 2). There is no evidence for the relationship between these two features except that their plan revealed on the aerial photographs makes it unlikely that they were in existence at the same time. They nonetheless represent the same general phase of activity and, on the basis of parallels elsewhere (Cunliffe 1991, 285), the larger enclosure ditch is likely to be later than the palisade trench. Given the total absence of dateable finds from the excavation we rely on general later Iron Age parallels to suggest a similar date for both palisade and enclosure.

Ditch 1 (Illus. 3.3, 3.4, 3.5 and 3.9, section B-A) was a narrow feature, *c.* 300mm across, with a sharp V-shaped profile up to 200mm deep which had evidently been truncated by erosion of the subsoil. Its base and plan were both somewhat irregular, and given the character of the ground, it seems unlikely to have been for drainage. The sharp profile and homogeneous fill suggest that it perhaps carried a plank-built palisade.

Structure 1 (Illus. 3.3-3.6) comprised a sub-rectangular arrangement of post holes, *c.* 4.5m long (north-south) and tapering from *c.* 3.4m wide at the south to 3.0m at its northern end. It was constructed from substantial post holes which were mostly spaced *c.* 200-300mm apart. They survived cut into the subsoil to a depth of *c.* 200mm, and must originally have been somewhat deeper. In three of the post holes, traces of squared timber survived as black stains (Illus.3.4). These showed that the structure had been built with substantial baulks of rectangular section *c.* 100mm thick and between *c.* 140mm and 200mm long. There was no evidence for the location of any entrance to the area enclosed by the post holes.

The nature of Structure 1 remains uncertain as no parallels have been found in the corpus of known Iron Age timber structures. There are arguments for and against it having been roofed. Its size and plan support the idea; indeed, the timbers in the long walls are arguably paired across the building whilst post holes 52 and 37 are central in the shorter walls, so could have supported a ridge-piece from which the



Illus. 3.3 *Bursea Grange. Plan of excavated features in Area A*

rafters of a roof were hung. However other features, apart from the absence of a door opening, cast doubt on the presence of a roof. First, it is notable that the structure is very heavily built with substantial and closely spaced timbers. It should also be noted that the timbers visible in the walls are poorly aligned with its principal axis. Secondly, the failure to make the long walls parallel would have created difficulties in roofing. This asymmetry would have resulted in either a sloping ridge or an uneven roof pitch if a roof was supported on the tops of the substantial walls. An alternative interpretation might be that Structure 1 formed a substantial stockade rather than a roofed building.

Ditch 2 (Illus. 3.3 and 3.9, section C-D) represents the palisade trench noted on the aerial photographs. Excavation revealed that it had a steep sided and angular profile cut up to *c.* 250mm into the subsoil. The floor of the trench was generally flat and *c.* 300mm wide, broadening to 600-700mm at the excavated subsoil surface. The unweathered profile and straight line of the feature support its interpretation as a palisade trench.

Ditch 3 (Illus. 3.3 and 3.9, section E-F) is the principal enclosure ditch. The profile of this ditch varied, having been weathered in places. In the best preserved section (Illus. 3.9, section E-F) it had a squared profile, *c.* 0.75m deep, and had been cut down to the surface of the clay which lay beneath the aeolian sand. The ditch floor was essentially level and *c.* 1.0m wide at the bottom, widening to more than *c.* 2.1m at the excavated subsoil surface. The bottom of the ditch was damp during excavation and is evidently seasonally waterlogged. A small square cutting in the bottom of the ditch on its south side is best understood as a sump dug to enable water to be bucketed from the ditch. The sides of the ditch were eroded to varying degrees but along the southern side it was surprisingly well preserved given the nature of the subsoil. This suggests that it may not have been left open for very long after it was dug.

Area B (Illus. 3.7)

A trench was cut across the ring ditch (Structure 2, Illus. 3.2, 3.7 and 3.8) which was visible on the aerial photographs. The initial cutting examined the western side of the building; the trench was subsequently extended to reach its eastern wall. The features exposed are best interpreted as belonging to a single substantial building. Three structural elements were identified. The perimeter of the building was defined by two concentric gullies. The outer gully (Illus. 3.7 and 3.9, section H-G) was the larger of the two, being U-shaped, *c.* 550mm wide at the surface and 250mm deep. The inner feature was also U-shaped but only *c.* 300mm wide at the surface and *c.* 150mm deep. The two features were both interrupted by a doorway at the eastern end of the trench (ie. at the south-east of the building - Illus. 3.7). It is the exact coincidence of the location of the gap in the two circles which suggests that they are both parts of the same structure. A shallow scoop just to the south inside the entrance is perhaps associated with a door structure. It would appear that the inner gully, which was *c.* 17.5m in diameter, held a plank-built wall which supported the structurally essential ring-beam whilst the outer gully acted as a drain for the roof. The latter would have been essential in this very low-lying and wet situation.

At the centre of the building were a series of scoops and smaller post holes, the two largest of which may represent part of an assembly to support the roof. This round house is slightly offset to the east of the centre of both the phases of the enclosure but its general position suggests that it was broadly contemporaneous with them.

3.2.2 The finds

The site was almost devoid of finds. This is partly perhaps a result of the soil conditions which would not normally have allowed bone or metal objects to survive. A small jet object and a number of pieces of slag recovered from the site are reported upon below.

During the excavation two tiny fragments of amorphous burnt clay were recovered which seem more likely to be degraded daub rather than pottery. Given the relatively large volume of soil excavated and the presence of later Iron Age pottery on other sites in the area (below Chapter 5.3 and Section 6.4.3) the absence of pottery on this site deserves consideration. Two explanations may be offered for its aceramic character. First, the site may have been of low status or specialist function with the result that pottery was not deposited despite its use at other sites. This seems rather unlikely given the size of the round house and the character of the site. Second, the site may date to a phase before the later Iron Age and prior to the widespread use of pottery in the area. The association of a pot sherd with the Hasholme logboat (Millett and McGrail 1987, 138, fig. 29) arguably suggests that such an aceramic phase dates to before the third century B.C. Such a chronology is very tentative but would be consistent with the evidence from Welham Bridge (below Sections 4.2.3).

The slag

(identifications by Philip Clogg)

Only a small number of pieces of slag were recovered from the excavation despite the earlier discovery of reasonable quantities on the surface (Gazetteer no. 109). Information on the excavated finds is provided in Table 3.1. None was the product of smelting and the excavated material is representative of no more than small scale on-site metal working.

The jet object

by Lindsay Allason-Jones

In analysis (by Dr J. M. Jones of the Fossil Fuels (Postgraduate) Research Institute, University of Newcastle upon Tyne) this object has proved of be good quality jet with a reflectance of 0.22. This suggests that it has a source in the main jet field in the Whitby area. The shape is not one which could be caused naturally given the material. It would appear to have been sawn to shape and then snapped off a longer rod. One face has definitely been polished, two others possibly. Nothing survives which gives any clue as to the intended final use; it may have been intended as a pendant, a gaming counter, a very odd bead or whatever. The nearest objects in shape are the 'gaming pieces' from South Shields (Allason-Jones and Miket 1984, nos. 7.164-68) but these are much bigger (heights about 45mm, widths about 19mm). However, two faces on the piece under discussion do not look finished so it is possible that the object was never completed.

Exploitation of jet at Whitby starts in the Neolithic, with a major phase of production during the Bronze Age. There is then little evidence that the deposits were used until the end of the second century A.D. which marks the beginning of the major late Roman period of manufacture. Jet from the area was again widely traded from the medieval period.

This object was found unstratified on the ploughsoil surface just to the south of Area B and is not itself datable although it is perhaps most likely to have been deposited during the later Roman period. (Not illustrated).

3.2.3 The botanical samples

(with information from Jacqui Huntley)

A total of twenty samples for flotation were taken on site. These were processed and sorted at the time by Sarah Moynihan. The flots were examined by Jacqui Huntley in 1995. Only one of the samples (from Context 14, the fill of Ditch 1) produced any carbonized material. This comprised a single seed of *Sieglingia decumbens*. This is a heath grass which grows on acidic sandy soils and may have been an important weed amongst crops in the past.

3.2.4 The animal bones

identified by Louisa Gidney

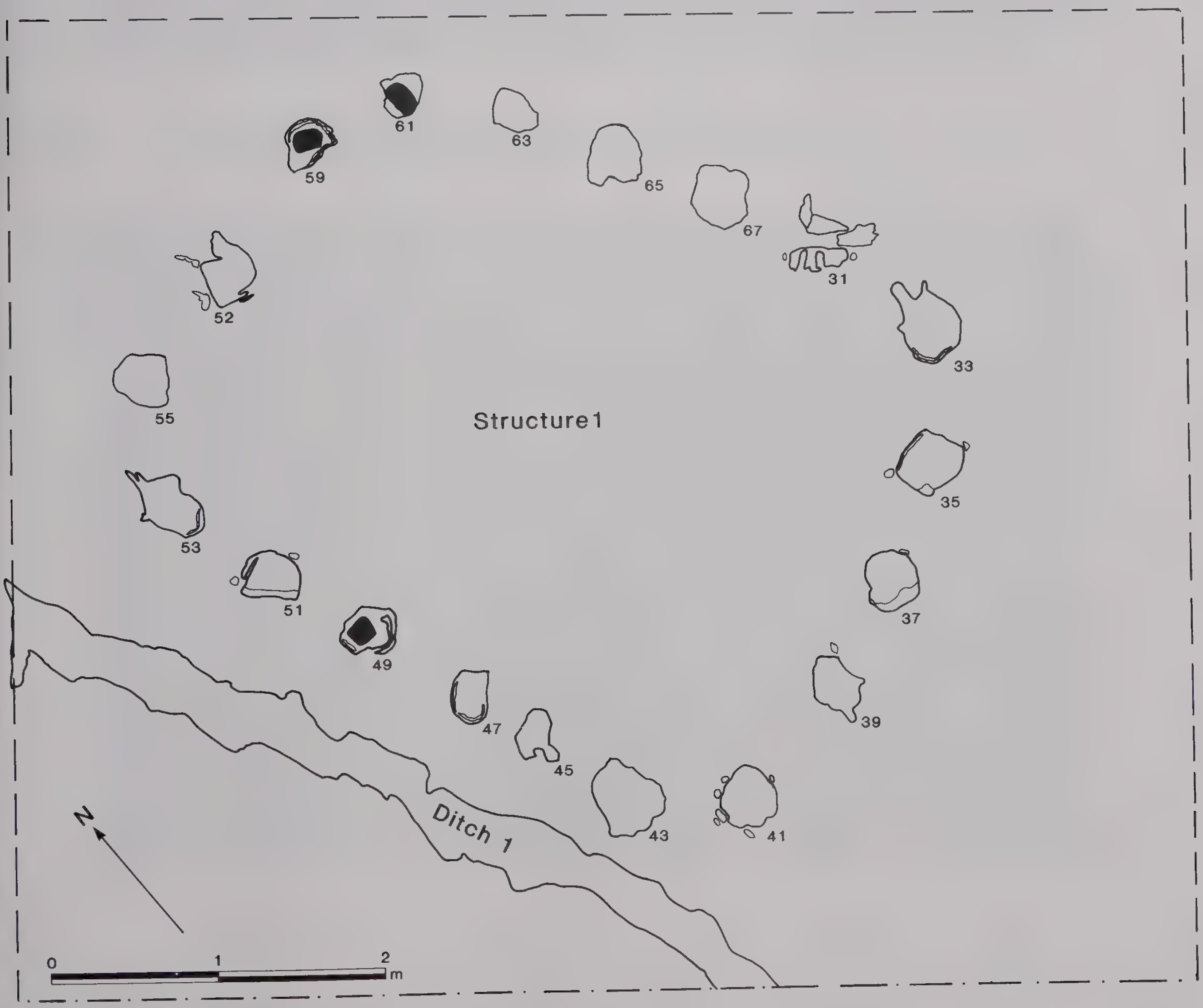
The soils on this site were not favourable to bone preservation. The following pieces were recovered.

Unstratified:
modern rabbit tibia
modern sheep femur
recent domestic fowl tarsometatarsus
fragmentary horse tooth, possibly ancient
Context 17 (lower fill of Ditch 3):
unidentifiable skull fragments, probably cattle

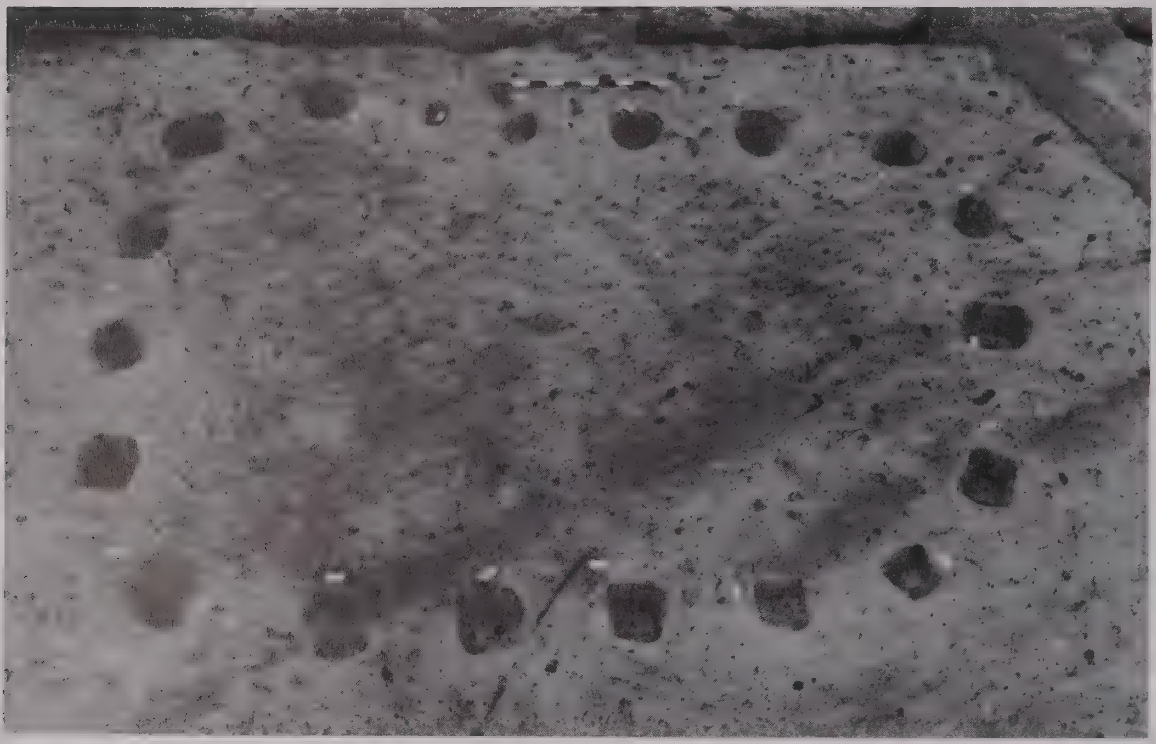
3.2.5 Discussion

The round house and enclosure are of a similar type to a number known from both the survey area (above Chapter 2.2; Illus. 2.14) and more widely in northern England which date to the middle-later Iron Age (cf. Haselgrove 1981). In the absence of other evidence it is assumed that this site is of broadly the same date. The absence of pottery from the excavation might tentatively support a date prior to the third century B.C. Structure 1 and Ditch 1 represent an earlier unenclosed settlement phase which is more unusual. These too cannot be dated but their general context would suggest that this phase immediately preceded the construction of the palisade. The pollen core from Hasholme nearby (Turner 1987, 85-88) shows some evidence for an increase in cereal type pollen in the upper part of the sequence, down to 810-530 Cal. B.C. The precise dating of this change is unclear, but it is arguably associated with the occupation of sites like this in the area.

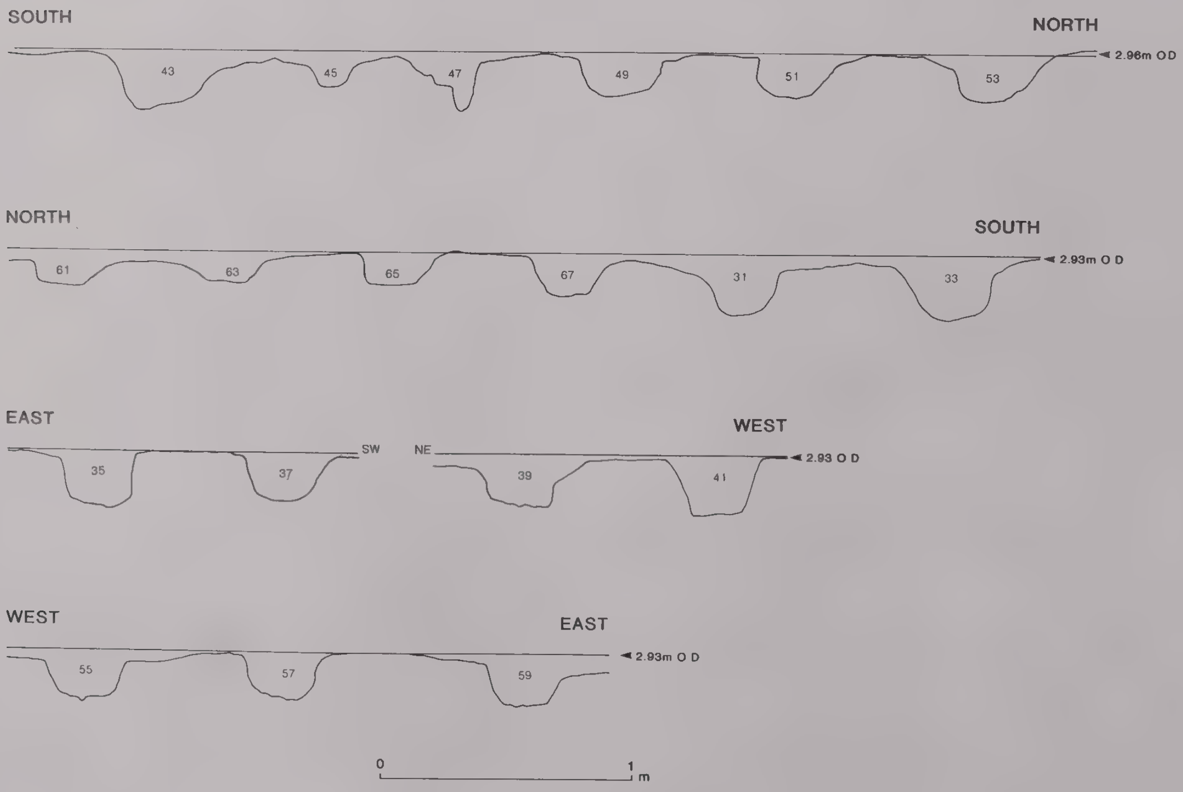
Ditch 1 of the unenclosed phase continues beyond the excavation to both north-west and south-east. This feature is very slight but may perhaps be identified with a feature plotted from some of the aerial photographs which continues



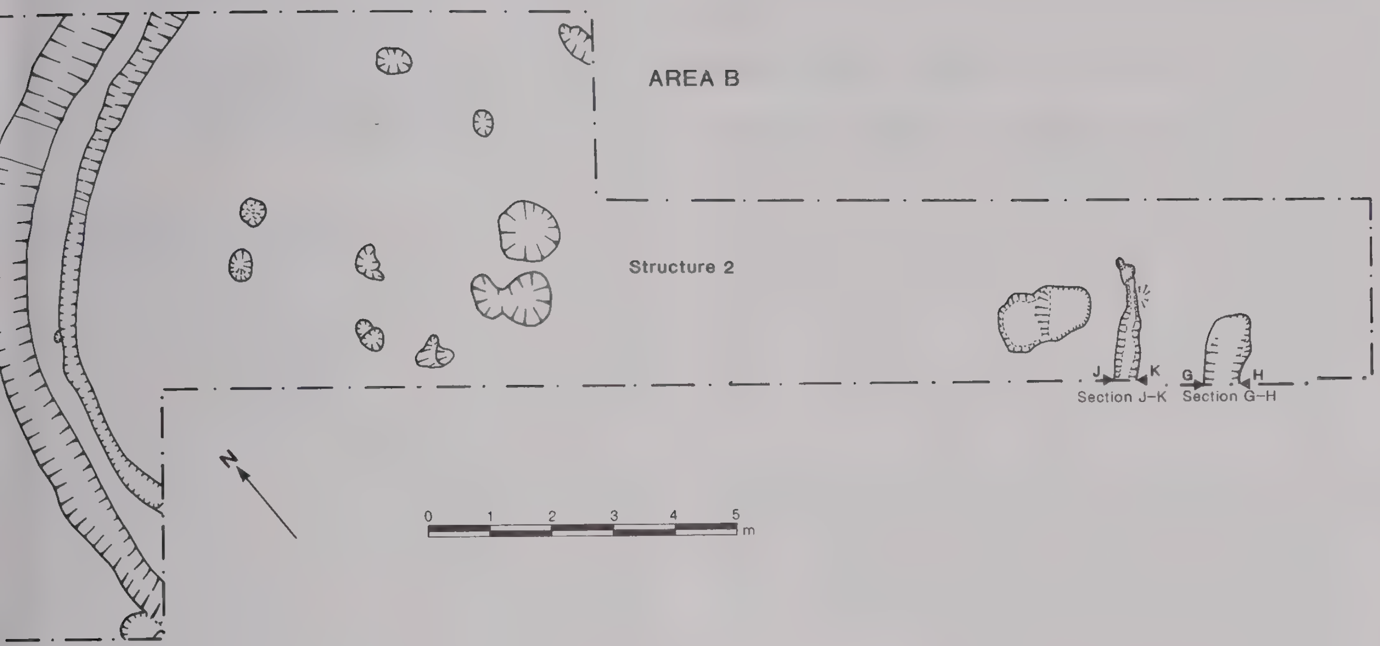
Illus. 3.4 *Bursea Grange. Plan of Structure 1 in relationship to Ditch 1*



Illus. 3.5 *Bursea Grange. Photograph showing Structure 1 as excavated from the north-east. Ditch 1 runs along the top edge of the picture. One metre scale. (The feature on the right hand side is a later agricultural intrusion.)*



Illus. 3.6 *Bursea Grange. Profiles of the post holes in the walls of Structure 1*



Illus. 3.7 *Bursea Grange. Plan of excavated features in Area B.*

Illus. 3.8 *Bursea Grange. Photograph showing the western half of Structure 2 from the north-east*

for some 50m to the south-east of the later enclosure (Illus. 2.11). It must be emphasized that this linear feature cannot yet be unambiguously identified with Ditch 1, but it does appear to form the northern side of a rectilinear enclosure or field, *c*. 50 by 75m, whose eastern side perhaps forms part of a droveway. Other features on the same alignment in this part of the survey area arguably represent further elements of this landscape. If this association could be confirmed, it would

Table 3.1

Bursea Grange stratified iron slag (number of fragments)

Feature	Cinder	Undiagnostic iron working slag	Smithing slag	Smelting slag
Ditch 2	-	-	1	-
Ditch 3	2	-	-	-
Structure 1	1	-	-	-
Round house gully	2	5	-	-

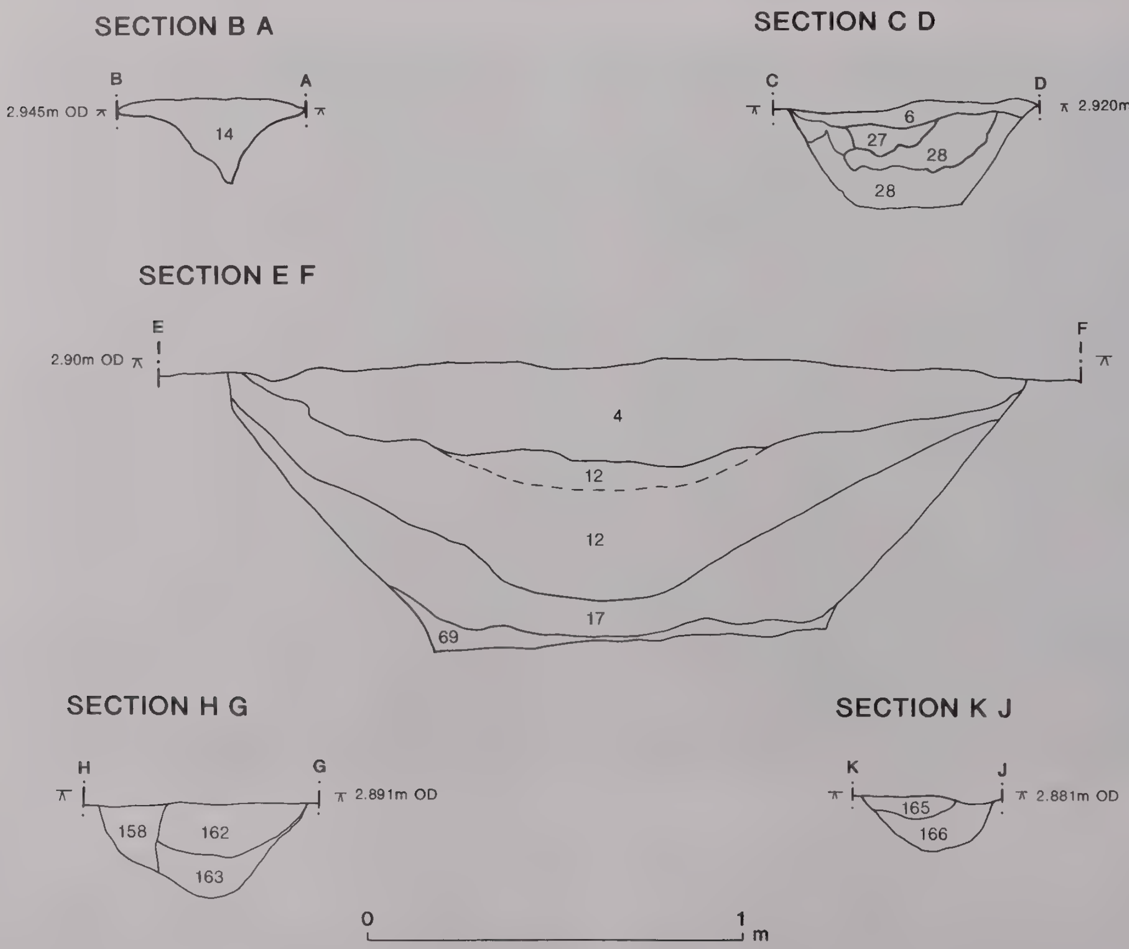
also provide a context for Structure 1 which is placed close to the Ditch 1 on its northern side. This building might thus represent part of a settlement from within a broader agricultural landscape. These suggestions must remain tentative until further evidence from aerial photography, geophysics or excavation becomes available.

The existence of this earlier unenclosed phase also raises interesting general issues about the region especially as the building was not revealed by aerial photography even though the situation is particularly good for the production of cropmarks. This fragmentary evidence raises the prospect that there may be a generally undetected phase of Iron Age or earlier landscape exploitation in the region which may only be found by accidental discoveries like this one. The apparently aceramic character of the region during the occupation of this site means that similar settlements are unlikely to be detected by field-walking.

The enclosed settlement falls within the normal size range of similar sites in the area (Illus. 2.14) and elsewhere in northern England (Haselgrove 1981, fig. 10; Cunliffe 1991, chapter 13). The absence of any certain entrance to the enclosure may be because the ditch was needed for drainage in order to keep the very low lying interior relatively dry. In such circumstances the ditch could easily have been crossed by a bridge as is done in similar circumstances today.

The round house is at the larger end of the size range being approximately 18m in diameter (cf. Cunliffe 1991, figs. 12.19 and 13.29). It is difficult to be certain about the form of the house given the limited scope of our excavation but it appears to be fairly typical of the genre and it is notable that, in common with many other round houses of the period, it has a doorway which faces to the south-east (Oswald 1996).

The very limited array of finds makes comment on the economy of the site impossible. Equally, the disappointing results from the flotation programme make it impossible to draw any sound conclusions about the agricultural economy.



Illus. 3.9 *Bursea Grange. Sections of the principal excavated features. For locations see Illus. 3.3 and 3.7*

CHAPTER 4

INDUSTRIAL SITES 1: IRON PRODUCTION

4.1 Iron-working

The evidence for smelting and iron production discovered by field-walking has been presented above (Section 2.3.5). In addition to this evidence, which suggested that the iron-working was not exclusively or primarily of Romano-British date, previous work has also provided information about this industry. Evidence for iron-working was found during the excavations at Hasholme Hall 1970-72 (Gazetteer no. 37 and below Chapter 5.2; SE 823328). Considerable quantities of slag, some in large pieces, had been found scattered around this location since the 1950s. During the excavation possible evidence for smelting was found in the form of a furnace which was unfortunately inadequately recorded. It was, however, shown on an unpublished excavation plan which has been used in the re-evaluation of this site (Illus. 5.4). The feature was lined with baked clay which had been reduced and the base of the furnace contained some slag. The furnace, from Peter Halkon's personal recollection, was probably the clay-lined bowl remaining from a shaft furnace (Cleere 1976a), although it may possibly have been a smithing hearth (Crew 1995). The stratigraphic associations of this feature are not recorded and it is dated to the Romano-British period only by its general association with other features on the site.

Evidence of smithing was found also during the same Hasholme excavation in the form of an iron anvil discovered in grid square H4 to the north-east of Kiln 1 (Illus. 5.4). This has been discussed by Manning and is identified as of typical Romano-British type (1975, 67-69). This anvil would have been set in a wooden block and was probably used in the working of blooms (Cleland 1981, 165).

Only modest quantities of iron-working debris were recovered from the excavations at Bursea Grange with no certain evidence of smelting (above Table 3.1). By contrast, the reasonable quantities of slag were excavated at Bursea House (below Table 5.7). Here, smelting was certainly in evidence with the predominance of this evidence coming from Period D which dates to the late third-fourth century A.D. (below Section 5.3.2).

The field-walking evidence thus shows the iron-working was geographically widespread (Illus. 2.25). Equally, although excavated evidence from two of the more complex sites confirmed that working had taken place into the Romano-British period, the majority of the major sites identified through field-walking are unlikely to have been of this date. Against this background it was evident that further work was desirable to clarify the chronology of iron production and to investigate its technology and context.

4.2 Excavations at Welham Bridge 1985

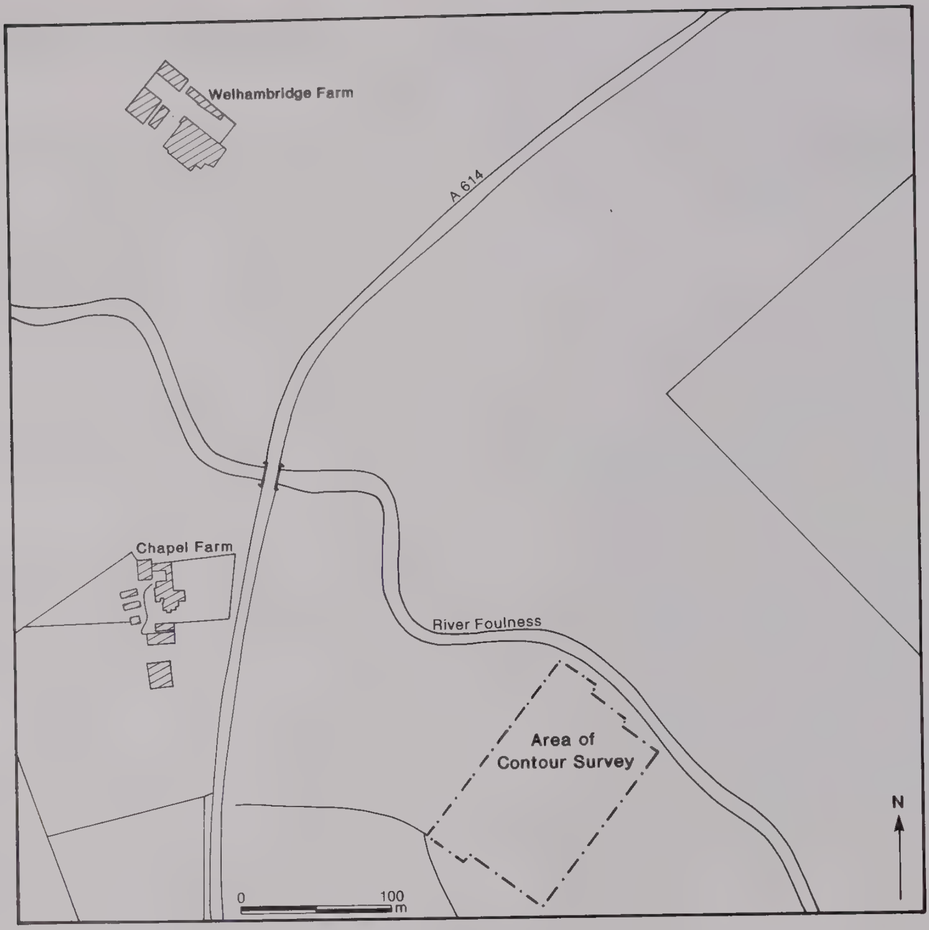
4.2.1 Introduction

The site at Moore's Farm, Welham Bridge (Gazetteer no. 121) is one of nineteen located during field-walking where there was substantial evidence for iron production (above Section 2.3.5). In 1985, we were informed that the farmer, Mr J. Oliver, intended to clear a mound of slag from his field because it was obstructing cultivation. It was therefore agreed that this should be done as an archaeological excavation; this work was carried out in August 1985 principally with student labour. The site supervisors were Andi Dutton, Keith Paulin, Peter Stephens and Steven Willis.

The site (Illus. 1.2 and 4.1) lay on the land of Moore's Farm and was located on the southern side of the river Foulness about 300m south-east of the point where the river is crossed by the A164 (SE 79343408). The principal feature visible on the surface was a slag heap which stood proud of the field surface (Illus. 4.2). An agricultural worker who had known the farm since the 1940s told us that when he had first ploughed the field, the feature had not been visible and that it had gradually emerged from the ground over the years. It is clear from the geology that drainage and cultivation since the land was first used for arable cultivation in the 1940s has been causing the peat to desiccate and shrink with a resultant reduction in the level of the ground surface. This process has led to the exposure of the previously buried slag heap. It is also clear that during cultivation the slag heap has been used as a dumping ground on which to dispose of other lumps of slag and refuse found in the field. The excavation distinguished a primary phase of slag deposition from this later accumulation.

The shrinkage of peat has resulted in its erosion over most of the field, but only the highest parts seemed to have been seriously denuded through ploughing. In the highest part of the field, to the west of the excavated trench (Illus. 4.3) ploughing seems to have truncated the top of the sand hill removing any but the deepest archaeological features and leaving only a surface scatter in the ploughsoil. The Foggathorpe clay soils immediately to the south of the excavated area may explain the absence of settlement features like the excavated ditches (Illus. 4.8) on the aerial photographs (cf. above Section 2.2.1). No secure evidence for settlement was produced by field-walking. Whilst this may suggest that the slag heap was isolated, given the evidence for its Iron Age date (below Section 4.2.3), it may simply reflect the scarcity of pottery and other Iron Age finds in both field-walking and on excavations (above Section 3.2.2).

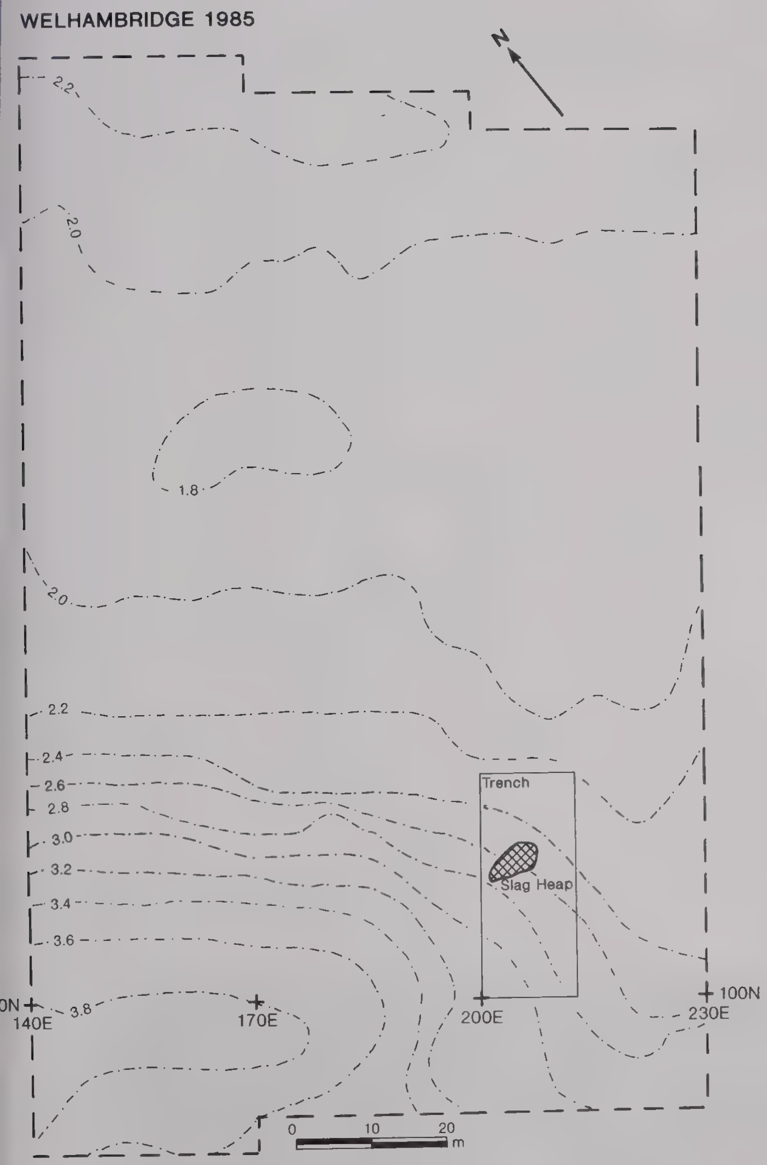
A contour survey undertaken during the excavation (Illus. 4.3) demonstrates that, even allowing for this erosion, there was a considerable slope to the north-east down from the sand hill (which lay above 3.8m O.D.) to a relict river channel 40m north of the excavation (at 1.8m O.D.). The present course of the river Foulness lies just beyond the northern edge of the contour survey where it has been embanked. The north-eastern corner of the trench exposed the



Illus. 4.1 *Map showing the layout of the contour survey at Welham Bridge. For general location see Illus. 1.2*

Illus. 4.2 *Welham Bridge. View of the slag heap from the southwest after initial clearance*

remains of a peat deposit and the relict channel is filled with the same estuarine clay as found on the site of the Hasholme Boat 3km to the east (J. Innes *pers. comm.*). The slag heap therefore seems to have been located on the slope at the edge of what was probably reed swamp or open water during the later Iron Age, and is no more than a dump in a convenient location peripheral to the workings and any settlement which may have lain on the top of the sand ridge above the river.



Illus. 4.3 *Welham Bridge. Contour survey of the area around the slag heap showing the location of the trench*

4.2.2 The excavation

An area 14 by 29m around the slag heap was cleared of vegetation (Illus. 4.2) and the surface of the slag heap was contoured (Illus. 4.4). This showed it to be oval in shape, with its long axis on an east-west alignment as though it had been created by being dumped progressively out from the slope top. The surface of the mound was highly irregular in shape, since it was made up of large pieces of slag with little soil matrix in between (Illus. 4.2). At its maximum it was about 5m long by 3m wide and stood 1m above the adjacent ground surface.

Excavation was confined to a principal area 7m by 21.5m, with a 3m by 7m extension to the east (Illus. 4.8). The work was designed to (a) investigate the slag heap which was to be removed archaeologically, (b) establish its relationship with any earlier features, and (c) ascertain whether any waterlogged features survived within the remnant peat.

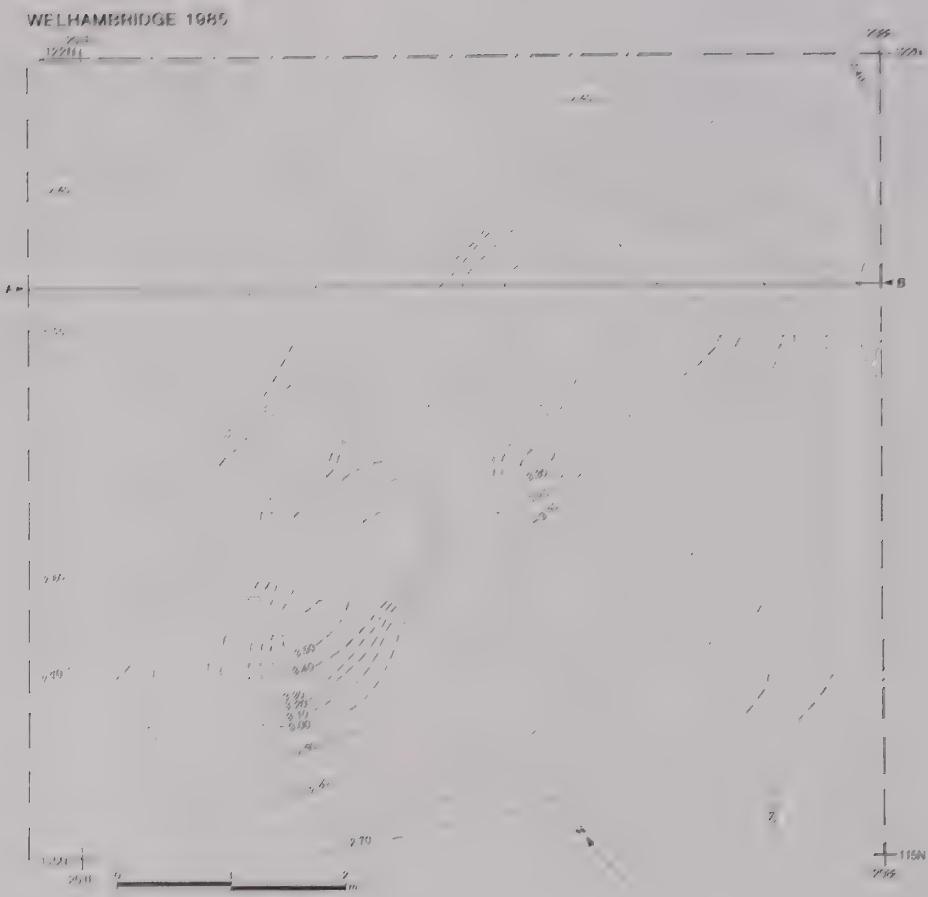
Investigation of the slag heap demonstrated that it was made up of two principal deposits. The upper part (Illus. 4.5) comprised large pieces of slag (context 3) which were more or less loose within a the remains of a matrix of decayed peat. Below these were further similar lumps which were more firmly positioned in a matrix of iron concretion. There is little doubt that the latter formed part of the original feature whilst some of the former may well have been piled on during recent agricultural field clearance. The heap had no evident form to suggest how it might have been constructed. Below this level, the heap had a more evident structure (Illus. 4.6 and 4.7) with the core of the heap formed from an almost level platform of consolidated and concreted slag (context 4) around the edges of which were larger fragments (context 65). The impression given was that dumping had progressed outwards from the east with the finer material being trampled into a platform as the dump grew. The largest of the furnace bases found derived from context 4.

The excavation dissected the slag heap and individual lumps of slag were sketched and weighed before being removed from the site (below Illus. 4.11 and 4.12). The total mass of slag removed amounted to 5338kg. Given the volume of material recovered, only a representative sample could be retained, the remainder being dumped into a nearby marl pit by the farmer. The character of the slag is considered below (Chapter 4.3). The slag heap contained nothing other than slag except for a single partly rotted timber post the stratigraphic position of which was ambiguous and was almost certainly recent in date.

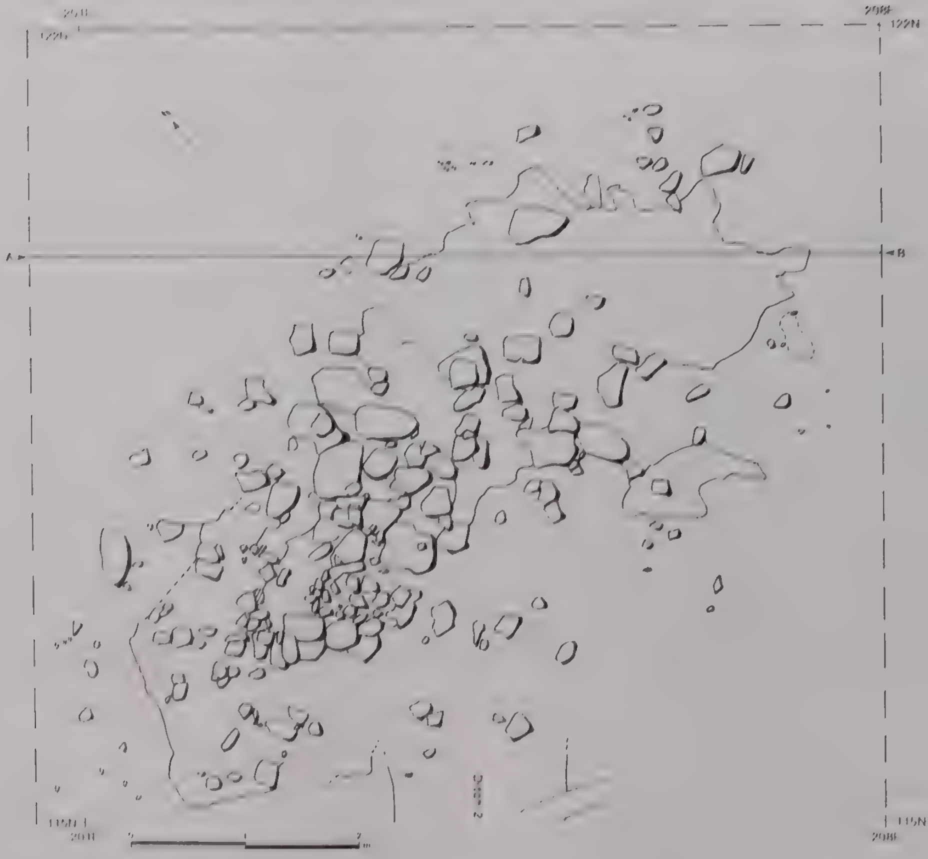
Excavation around and beneath the mound revealed a sequence of other features cut into the subsoil, which itself varied from clean aeolian sand to the east to more mottled sand with frequent iron pan to the west. Throughout the site there had been considerable disturbance caused by moles and other burrowing animals, so any post holes which might have existed were not distinguishable. The archaeological features found were three ditches (Illus. 4.8).

Ditch 1 (Illus. 4.8 and 4.9) was *c.* 0.5m wide and *c.* 200mm deep with a U-shaped profile. It skirted the south-eastern side of the slag heap and is thus presumably either contemporaneous with it or later in date.

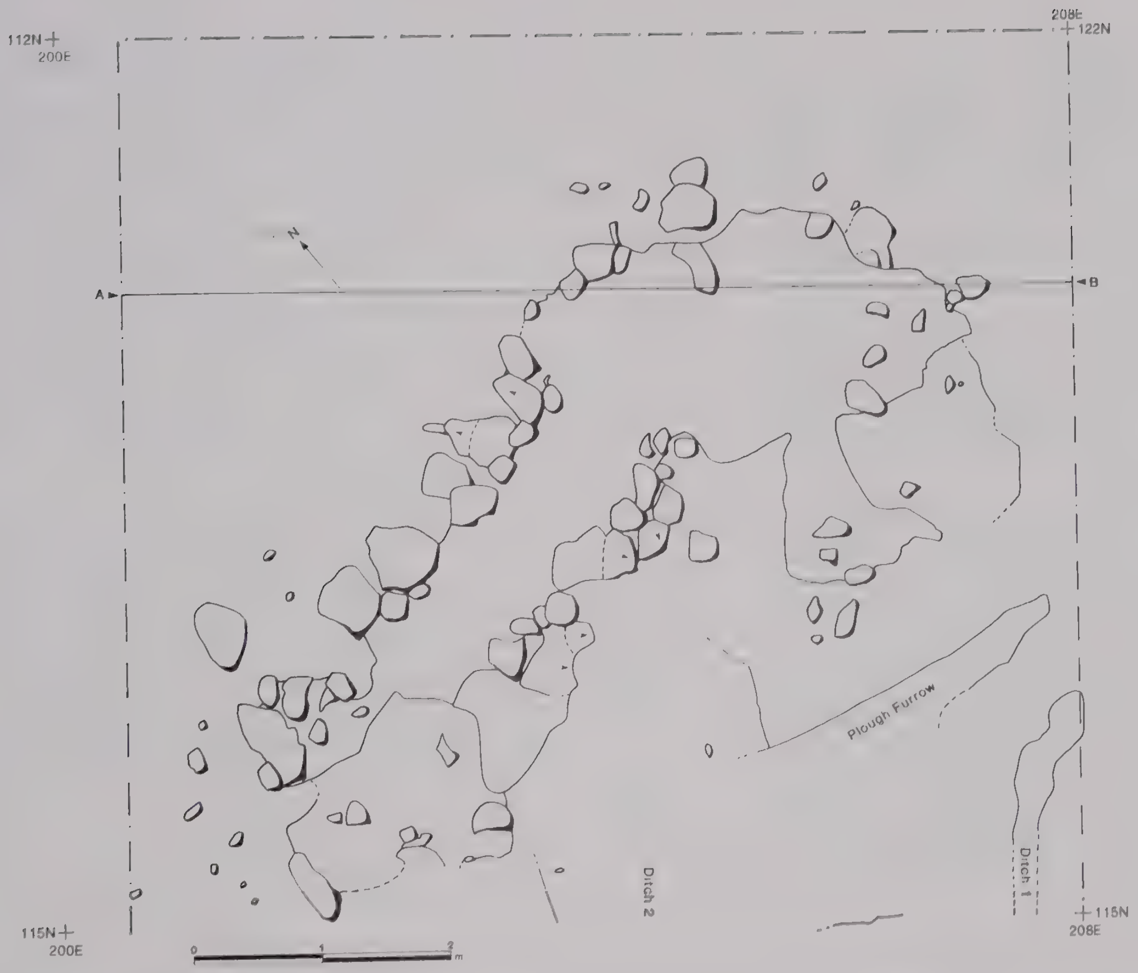
Ditch 2 (Illus. 4.8 and 4.9) was up to 350mm deep and *c.* 1m wide, with an eroded U-shaped profile. It had been eroded by ploughing at its southern extremity, but was over-



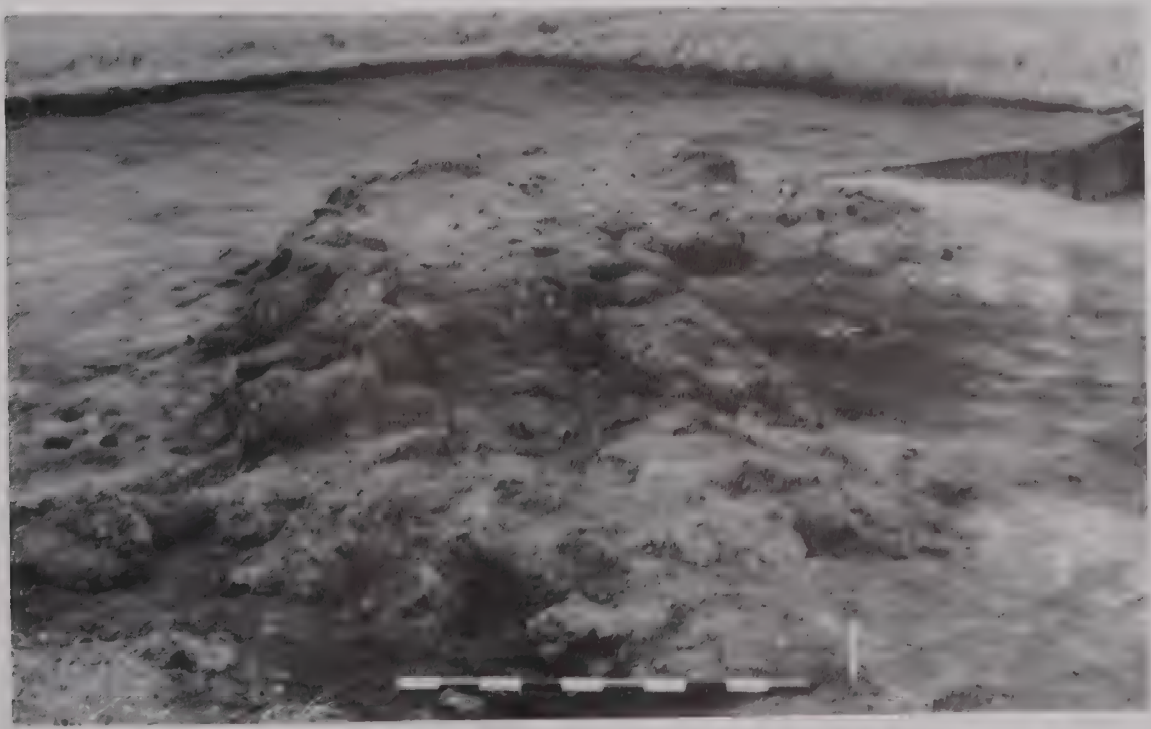
Illus. 4.4 *Welham Bridge. Contour survey of the slag heap after initial clearance*



Illus. 4.5 *Welham Bridge. Plan of the slag heap after initial clearance*



Illus. 4.6 *Welham Bridge. Plan of the slag heap after the clearance of the loose material*



Illus. 4.7 *Welham Bridge. Photograph from the west showing the slag heap after the clearance of the loose material*

lain by the slag heap further to the north. The profile suggests that it had become infilled before the slag was deposited. At its northern end the ditch petered out at about the 2.5m O.D. contour, arguably suggesting that it terminated at the edge of the wet ground.

Ditch 3 (Illus. 4.8 and 4.9) was more substantial than the other two ditches, being *c.* 1 m wide and *c.* 0.5m deep. Its plan suggests that it had been recut on several occasions, although this was not evident from the sections. It contained slag, so its final fill is probably contemporaneous with, or later than the slag heap.

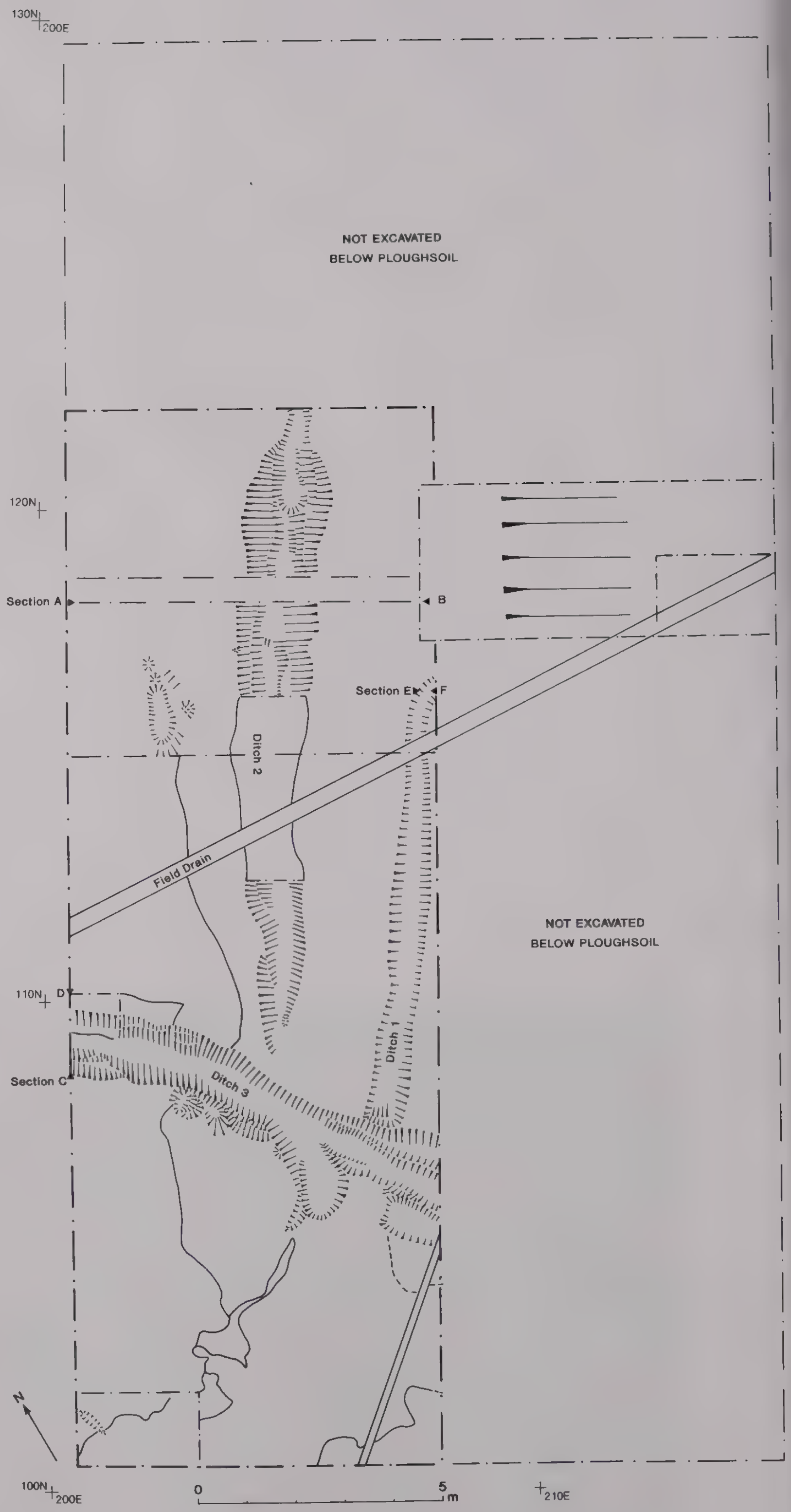
Ditch 3 ran down the slope to the south-east and despite plough damage, it appears that Ditches 1 and 2, which drained north-eastwards, respect its line. Given this relationship all the features should be considered together. The line of Ditch 3 was evidently established before the creation of the slag heap with Ditch 2 draining north-east from their junction. Ditch 2 was replaced by Ditch 1 during or after the use of the slag heap. Ditch 3 was evidently long-lived with its line continuing in use from before the inception of dumping until perhaps after its completion.

The character of the ditches suggests that they acted as drains carrying surface water from the hill-top down to the valley floor. They presumably also formed boundaries and in this context, it is interesting to note how the slag heap was apparently first created in the angle at the corner between Ditches 2 and 3, with the plot extended when Ditch 2 replaced Ditch 1. This enclosure or field corner location reinforces the impression that the slag heap was placed peripherally to any settlement.

To the east the trench was extended to provide a cutting into a lower area where some peat survived. The peat proved to be highly desiccated and there was no evidence of waterlogging at this level.

4.2.3 Dating

None of the excavated features produced any archaeological dating evidence. It can be argued that given the widespread occurrence of Romano-British pottery in the Holme area its absence, even as residual material, suggests a pre-Roman date. Given the total lack of excavated artefacts, dating depends on radiocarbon assays from charcoal incorporated in the slag. Substantial pieces of carbonized wood were mechanically extracted from the core of two of substantial furnace bases by crushing the slag, boiling a sample in concentrated HCl and then washing it clean with distilled water. These samples were submitted to A.E.R.E. Harwell for measurement.



Illus. 4.8 *Welham Bridge. General plan of the excavation after the removal of the slag heap*

ample 1 (HAR-9234) came from a furnace base ound within the core of the heap (context 4). ample 2 (HAR-9235) came from one of the loose urnace bases on the top of the mound (context 3).

The radiocarbon ages are given in Table .1 and Illus. 4.10. Both are consistent with a mid late Iron Age date. There is a little overlap in the ates at the 68 percent confidence level but the vell stratified sample (HAR-9234) appears later han the other sample. The significance of these ifferences are impossible to evaluate in the ab- ence of further samples but there can be little loubt that the iron production on this site took lace sometime in the sixth-third centuries B.C.

.2.4 The botanical remains

with information from Jacqui Huntley)

A total of four samples for flotation were taken on ite. These were processed and sorted at the time y Sarah Moynihan. The flots were examined by acqui Huntley in 1995. None produced any car- onized material.

4.2.5 The animal bones

identified by Louisa Gidney

The soil conditions on this site did not favour the preservation of bone. Three items were recovered.

Unstratified

Pig tibia, very young piglet

Context 9 (surface below ploughsoil)

Horse, part of pelvis, pony sized. Poor condition

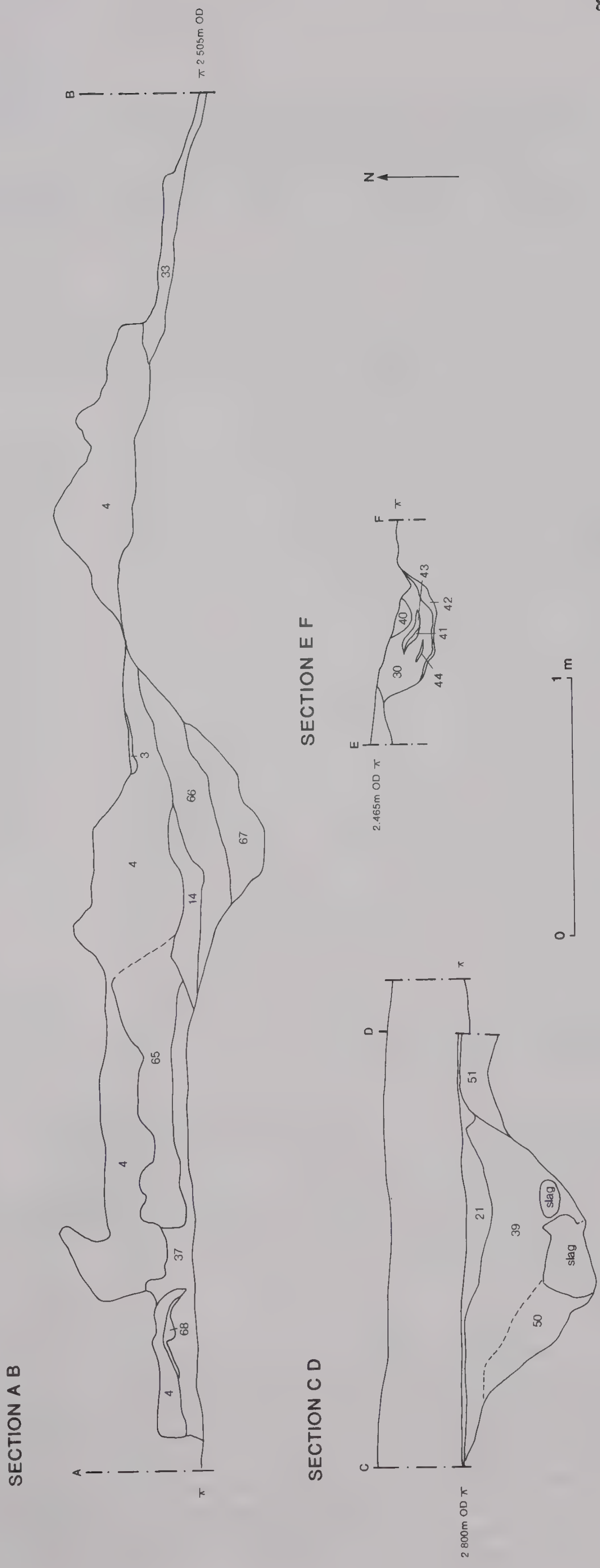
Context 56 (surface below ploughsoil)

Tooth fragment, very decayed, probably cattle rather than horse.

4.3 The Welham Bridge slag

by Philip Clogg

Iron-working slags are the vitrified waste products formed during the processes involved in the extraction of iron from its parent ore (ie. the smelting process) and the subsequent working of the iron to produce artefacts through smithing and forging. Slags are formed by the action of heat on the various components present during the particular technological process in use and act as carriers for the impurities introduced by these components. In



Illus. 4.9 *Welham Bridge. Sections of principal features. For locations see Illus. 4.4-4.8*

Table 4.1

Welham Bridge radiocarbon dates

Harwell Reference	Context	Material	Age B.P.	Calibrated Ranges 68 %	95 %
Har-9234	4	Charcoal	2260 ± 70	400–200 Cal. B.C.	410–170 Cal. B.C.
Har-9235	3	Charcoal	2370 ± 60	520–390 Cal. B.C.	770–370 Cal. B.C.

Note: Calibrated ranges have been calculated using the maximum intercept method of Stuiver and Reimer (1986) and they are quoted in the form recommended by Mook (1986) with the end points rounded outwards to 10 years. The calibrations have been calculated using the data published by Stuiver and Pearson 1986 and Pearson and Stuiver 1986.

the case of the smelting operation this would in the main be the ore and the fuel. The nature of the material will also be affected by the conditions prevalent during the process (ie. temperature variations and the presence of oxidizing or reducing conditions within the furnace). These factors contribute in producing a complex and heterogenous material which is difficult to classify or describe.

The aim of any physical and chemical examination of iron-working bloomery slags is to provide an insight into the iron production system of which they are a by-product. Problems arise, however, in gaining precise information on specific aspects of the system (eg. the type or range of iron ore which was in use) due to the uniform chemical and mineral composition of the material. Chemically iron-working bloomery slags are composed of a combination of iron and silicon which, if calculated as oxides (ie. iron oxide (FeO) and silica (SiO_2)), form approximately 90 percent of the total composition, the remainder being 'impurities' gained in the main from the ore and the fuel. In mineral terms, the material is composed of free iron oxide (usually wustite), fayalite (an iron silicate) and a glassy phase. Of the three phases, the wustite and the fayalite maintain relatively fixed compositions which only allow for the inclusion of minor amounts of specific elements (eg. magnesium is capable of replacing the iron within the fayalite structure) leaving the glass phase, a chemically less well defined material, as a major source of the compositional variation within the slag.

This study is undertaken with an awareness of the restrictions imposed upon the level of interpretation of the relationship between iron-working slag, its raw materials and formation processes. A detailed physical and chemical examination of the material is, however, considered a relevant first step in objectively establishing the nature of the material and providing a body of results and observations which would extend the currently available data within this field of study.

Although primarily concerned with the investigation of the Welham Bridge material it is accepted that a fuller understanding of the iron production system comes not from viewing these results in isolation but in their use in a broader context. To this end some comparative analysis from the work of Morton and Wingrove (1969), Allen (1988) and McDonnell (1988) are considered, thereby allowing a more objective appraisal of the Welham Bridge results. The comparative material includes that from the site of North Cave, East Yorkshire, an Iron Age/Romano-British settlement not far distant from Welham Bridge (Dent 1989; for location see Illus. 1.2 and 8.1).

4.3.1 The material

The material consists of a total of 5338kg of iron-working slag ranging in size from small fragments to 'complete' pieces weighing up to 74kg (Illus. 4.11). All the material was weighed and a selection was made on site of the more 'complete' examples for further detailed examination and analysis. This selection consisted of thirty-seven items covering the morphological range. These were drawn to scale and measurements in cm along three orthogonal axes (described as the long axis, short axis and depth) were recorded. The weight was measured in kg. Observations on the form and texture of the outer surfaces were made in order to furnish evidence of their history of formation. In addition, particular note was taken of any well defined 'shaped' regions/sections which may reflect the form of the associated structures.

Detailed physical and chemical examination

A sub-set of thirteen pieces, considered representative of the range, were selected for more detailed physical and chemical examination. The aims of the investigation were (a) to characterize the material chemically, and (b) to identify any physical characteristics of the slags which reflected those of the structures with which they were once associated (furnace, pit etc.).

In addition to the recording process described above, each of the thirteen pieces was sectioned along its longitudinal axis to ascertain information on the gross internal structure. The distribution of the three main components visible in the cross-section - the slag mass, the charcoal and the gas holes - was described and considered in relation to both the method of formation of the slag (eg. was it raked or tapped from the furnace etc.) and its position of formation (eg. was it formed inside or outside the furnace, in a pit etc.).

Samples from across the section were prepared and analyzed to determine their mineral composition, the chemical composition of the phases present and their bulk chemical composition. Eight samples were taken from four separate areas across the face of each section. A polished thin section was prepared from each of the areas for microscopic examination of the mineral texture and mineral composition. The polished sections were subsequently used for the hemical analysis of the individual phases using an electron nicroprobe fitted with a Link Systems microanalyser. The ystem was calibrated with iron ore standard ESI 680.

The remaining four samples were used for the dermination of the bulk chemical composition. The analysis vas carried out using a Link XR200 energy dispersive x-ray pectrometer calibrated with iron ore standard ESI 680.

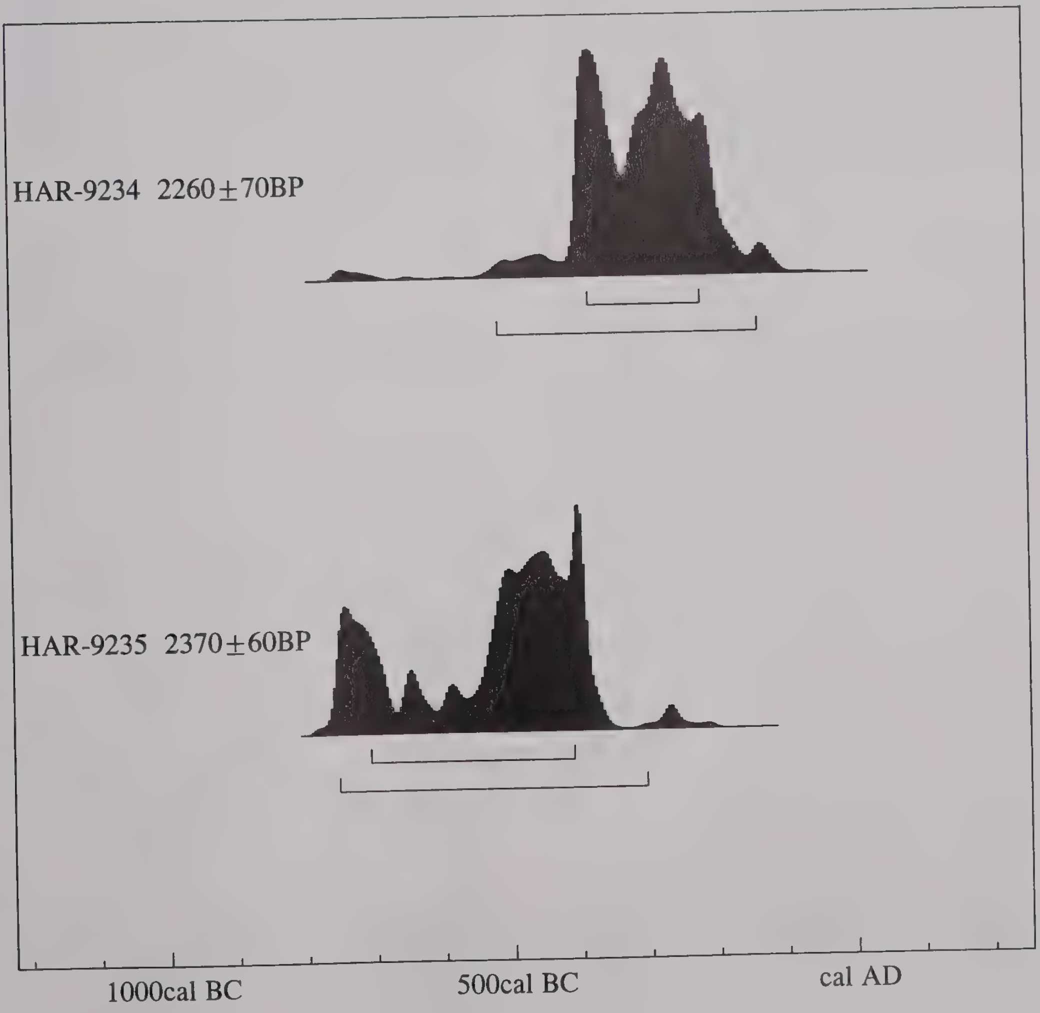
Due to the nature of samples 23 and 30 (see below or details), two sets of samples were taken from each of these xamples and processed separately. These are numbered 23.1 nd 23.2, and 30.1 and 30.2 in all the subsequent tables.

Description of physical characteristics

The results of the physical examination of the full range of pieces are shown in Table 4.2 and Illus. 4.12. The examination identified four distinct morphological forms: (1) plano-convex furnace bottoms, (2) elongated convex furnace bottoms, (3) dense hemispherical chunks, and (4) large elliptical vesicular masses. Much of the material appeared complete with well defined outer curved surfaces seemingly moulded from their associated structures during formation.

Of the thirty-seven examples, twenty were considered to be of the typical plano-convex type with a well-formed curved base and curved outer edges. These are termed group 1; a typical example is shown in Illus. 4.13. These forms showed a mean radius of 180mm and a depth of 170mm with a mean weight of 12.7kg. The well-defined curved regions evident on a number of these pointed to their formation within structures of internal diameters of between 300 and 400mm. The upper surfaces generally showed a flowed texture whilst the curved base was composed of small globules or dribbles of slag welded into the mass. Little charcoal was evident on the external surfaces

A variation on the plano-convex hearth bottoms are what are termed here as elongated convex hearth bottoms (Illus. 4.13 group 2). These are larger than the plano-convex examples and show a well-defined dimensional difference in plan view between the length and breadth. Of the four examples examined the average dimensions were 525mm in



Illus. 4.10 *Welham Bridge. Probability distributions of the radiocarbon ages calculated using OxCal (version 2.0; Bronk Ramsey 1994) and the usual probability method (Stuiver and Pearson 1993). For samples see Table 4.1*

length, 373mm in breadth and 245mm in depth. The average weight was 26.6kg. The upper surfaces were very irregular with evidence of large charcoal inclusions and in the case of number 37 two well defined hollows. The lower surfaces were more compacted with a regular flattened curvature.

The larger hemispherical pieces (Illus. 4.13 group 3) showed a very regular shape with a smooth flat upper surface and a deep bowl, the outer surfaces of which appeared to be composed of vesicular material with large charcoal inclusions. The four examples examined displayed a mean radius of 255mm and a depth of 386mm. The average weight of these was 45.75kg.

The fourth distinct class of slag includes the heaviest pieces. Examples tend to exhibit an irregular elliptical form in plan whilst the cross-section could be described as a flattened 'mushroom' shape (Illus. 4.13 group 4). A number of these show compacted and clearly defined curved edges suggesting their having been formed against a vertical containing structure. In general, however, the surfaces are irregular with some charcoal inclusions clearly visible. The mean radius of the seven examples examined is 327mm with a mean depth of 354mm. The average weight being 59.7kg.

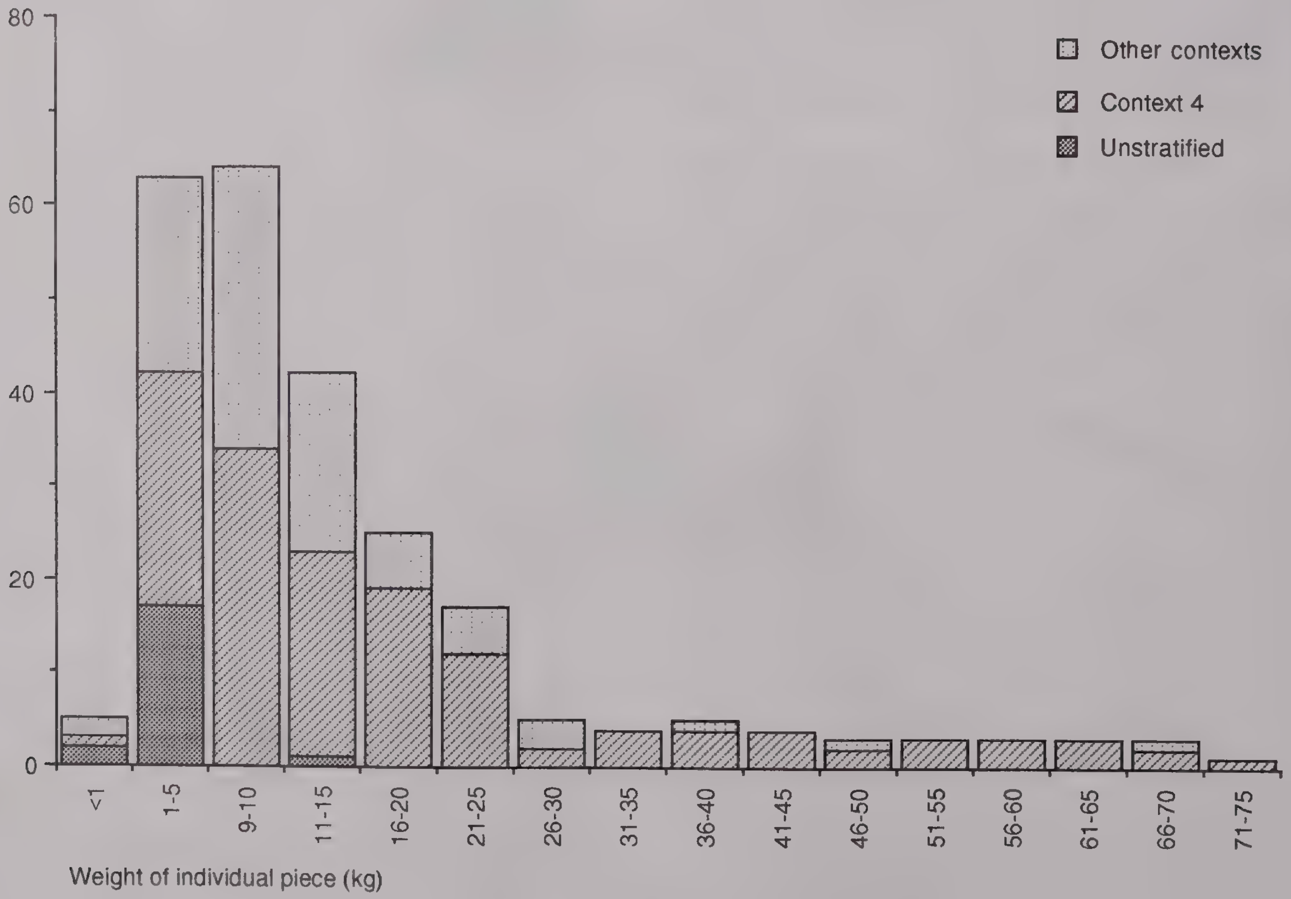
Two very irregular shaped pieces (samples 17 and 35) exhibited a very open structure with large charcoal inclusions incorporated into the matrix. These were considered as fragments from either group 2 or group 4 pieces. The charcoal was extracted from these samples for radiocarbon dating (above Section 4.2.3).

Distribution of internal features

The following descriptions of the internal distribution of the gross components of the slag lumps (ie. the solid areas of slag), the charcoal inclusions and the gas holes are based upon observations made from the cross-sections of the thirteen examples which underwent the detailed laboratory examination.

The plano-convex furnace bottoms were shown in the main to be a fairly solid mass of slag tending to concentrate towards their upper corners. The vesicularity increased away from the upper surface and any charcoal present was distributed towards the extreme edges. No form of 'zoning' or layer separation was evident within the cross-sections.

Examination of the cross-section from the elongated convex furnace bottoms showed a much less dense material than the plano-convex examples. An increase in vesicularity was evident and a large quantity of charcoal was concentrated around the upper central area with many of the pieces being up to 20mm in length. The slag was distributed thinly throughout the cross-section with no apparent layering or



Illus. 4.11 *Welham Bridge. Mass (kg) of slag pieces recovered from the site*

ncentration of solid slag material.

The examination of the cross-sections of the emispherical pieces revealed a dense body of slag approxinately 150mm deep concentrated towards the upper central rea of each. This was bounded by a greatly increased veicular outer region incorporating a charcoal and slag mix. here was no evidence of layering other than this marked eparation between the solid slag zone and the remaining mix f components.

The larger irregular shaped examples showed no pparent concentrations of any of the three main components. All three components were present in a random mix with no vidence of 'zoning' or layering of material. The charcoal fragments were relatively large (up to 20mm in length) and the gas holes present measured up to 10mm in diameter.

Microstructural analysis

Examination of the polished sections showed the main mineral components of the slags to be wustite, fayalite and a 'glassy' non-crystalline phase (Table 4.7). Fayalite occurred in all the samples and was, without exception the major constituent. The texture of the mineral varied a great deal both between samples and in some cases within the samples. This was as expected with the variation in texture reflecting the different cooling regimes within the material. The larger volumes of homogenous material exhibited large euhedral crystals of fayalite with little local variation. This was particularly so in samples 23.2 and 30.2 from the more dense areas of the hemispherical group 3 examples. Whilst the samples from the more heterogenous vesicular areas and those from the outer regions exhibited thin angular fayalite lathes, often with sudden changes in orientation, illustrating the gradual build up of these areas from small, faster cooling, slag droplets.

The electron microprobe analysis of the fayalite phase (Table 4.4) showed consistent results across all the samples. The major components, iron and silicon, were present within a narrow ratio range of 2.1:1 to 2.3:1 confirming the optical analysis of the phase as fayalite - the theoretical ratio for fayalite being 2:1. The minor elements occurring in all the samples were manganese, magnesium and calcium. Manganese was present at relatively high levels of between 1 to 3 percent with the exception of samples 9.1 and 37 from the group 2 material and sample 12.1 from group 4. Magnesium and calcium appeared consistently at levels of between 0.3 and 0.6 percent. The presence of manganese and magnesium is not unusual within the fayalite structure as both elements can act as substitutes for iron. Phosphorous was detected at low concentration in five samples across the four groups whilst aluminium and potassium were detected in sample 12.1.

The wustite phase varied in concentration from almost zero (samples 23.2 and 30.2) to 55 percent in sample 23.1. Although basically dendritic in form their size and shape varied greatly across the range of samples reflecting, as with the fayalite, the cooling regimes within that particular area of the slag. Fine well developed dendrites were present within the heterogenous vesicular regions whereas in the more homogenous masses there was very little evidence of wustite. In samples 23.1 and 30.1 wustite appeared as large globular dendrites. The efficiency of the smelting process is reflected in the amount of wustite present within the slags thus allowing an appreciation of the level of expertise available during the smelt, however, the process is dynamic in the sense that the level of efficiency will initially be at a low level, rise as the furnace reaches its optimum temperature and conditions, and then fall due to either the build up of slag within the furnace and/or the intentional halting of the process. It may be possible to view these changes within the slags, however, they may be masked to some extent by factors such as the cooling regime which could allow an appreciable 'glassy' phase to form and encourage the iron to stay in solution.

The glass phase was recorded in concentrations of between 4 and 27 percent across the samples. As was expected, the greater concentrations occurred within those samples taken from the larger homogenous slaggy areas (samples 23.2 and 30.2), again reflecting the level of heat energy and the slower rates of cooling within these regions. The optical examination of the microstructure also revealed a number of very fine bright inclusions within the glassy regions which under examination using scanning electron microscopy appeared to be areas of high titanium concentrations.

Analysis of the glassy phase is shown in Table 4.5. Chemically, the bulk of the glass phase consisted of approximately equal proportions of FeO and SiO_2, aluminium was present at levels of 12 to 18 percent and there were consistently high concentrations of the oxides of calcium, potassium and phosphorous. Sodium, manganese and titanium were recorded at minor concentrations. Investigation of the recorded levels of calcium, potassium, aluminium and silicon suggest that the glass phase may be formed from a varying mixture of anorthite and leucite, this would account for all of the above elements leaving a small excess of silicon.

Bulk chemical analysis

The bulk chemical analysis showed consistent results across all the samples with generally low levels of alkali and glass forming oxides. Exceptions to this trend are samples 23.2 and 30.2 which produced high silica and low iron concentrations well outside the general range. This may be explained by reference to the optical analysis which shows extremely low levels of wustite, almost 80 percent of the composition being fayalite. The levels of manganese, although not uniformly high, are within the range of iron smelting slags as classified by McDonnell (1983) and reflect those concentrations within the fayalite phase. Two exceptions, however, are samples 29.1 and 32.1 (group 4 material) in which low levels of manganese are recorded within the bulk sample whereas the concentrations within the fayalite are well above the average - a discrepancy which may be attributed to the sampling procedure and the heterogeneous nature of the material.

Assessment of the minor constituents of the slag particularly the alkaline earths may be one area in which differences in composition reflect differences within the production system. This was examined through the use of a series of variograms (Illus. 4.15-4.18) based on the work of Allen (1988) in which the ratios of minor components to alumina were plotted as a function of the silica content. In order to aid in the assessment of the level of significance of variation within the Welham Bridge material the variograms were constructed against a background plot of the comparative material. The plots clearly show the relatively tight grouping of the Welham Bridge material with the alumina - silica ratio (Illus. 4.15) appearing very constant over the range of silica values whereas the calcium - alumina ratios (Illus. 4.16) appear to be inversely proportional to the silica content. With reference to Illus. 4.17 and 4.18 no significant trends or characteristics are apparent and there is no reflection within the data of the four identified physical groupings.

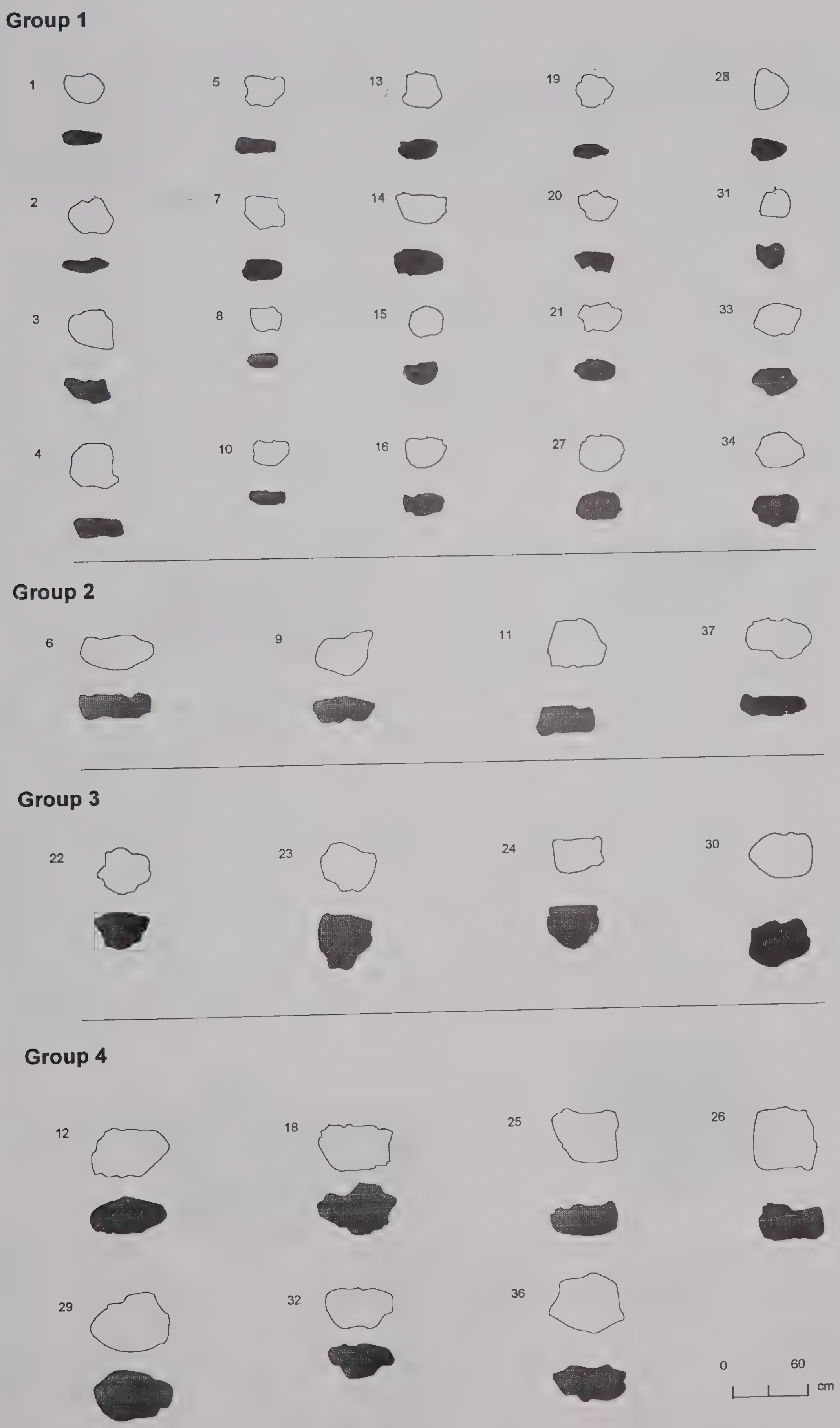
The iron oxide, silica, anorthite system

Work by Morton and Wingrove (1969) suggested that the composition of iron-working slags could be modelled on a three component system of iron oxide, silica and anorthite

Table 4.2

Welham Bridge. Dimensions of fully recorded slag pieces

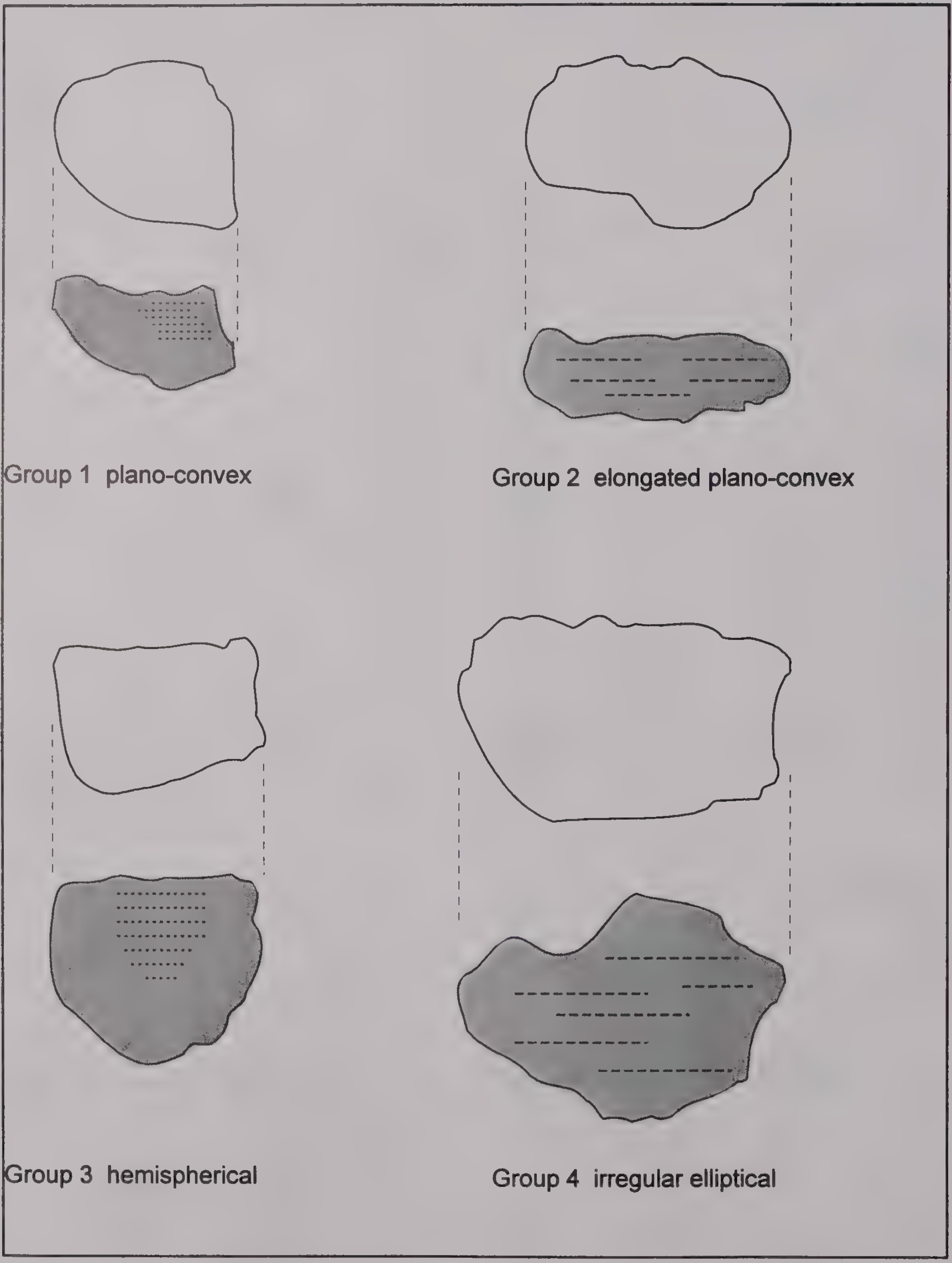
Sample number	Context	Weight (kg)	Length (mm)	Breadth (mm)	Depth (mm)	Maximum Radius (mm)
Group 1 Plano-convex						
1	2	8.75	331.42	257.19	120.53	169.00
2	2	10.00	372.78	307.13	121.61	191.00
3	2	16.25	419.95	328.80	218.66	215.00
4	2	17.25	422.72	399.89	207.91	220.00
5	2	8.25	361.87	299.21	172.23	187.00
7	2	10.25	377.71	295.89	206.62	190.00
8	2	7.75	287.80	237.18	136.81	147.00
10	2	7.50	291.00	223.00	115.00	152.00
13	2	11.50	334.42	331.76	183.43	174.00
14	3	18.50	432.76	274.45	242.54	226.00
15	3	13.00	303.51	257.20	200.56	154.00
16	3	12.00	343.01	260.47	190.74	182.00
19	Unstratified	11.00	314.27	279.37	130.62	169.00
20	4	11.50	335.98	254.34	170.32	175.00
21	4	13.50	368.85	244.29	185.16	191.00
27	4	21.50	385.40	311.54	242.46	194.00
28	4	10.75	329.05	304.29	191.27	179.00
31	4	9.50	245.00	225.00	202.00	116.00
33	4	14.50	406.70	291.49	236.95	202.00
34	4	20.25	401.21	289.25	282.93	206.00
Average		12.68	353.27	283.59	187.92	181.95
Group 2: Elongated plano-convex						
6	2	28.00	564.76	307.02	303.38	302.00
9	2	25.00	529.06	357.89	223.51	276.00
11	2	29.50	496.63	475.87	261.26	263.00
37	39	24.00	510.00	350.00	195.00	273.00
Average		26.63	525.11	372.69	245.79	278.50
Group 3: Hemispherical						
22	4	43.50	436.81	381.94	316.12	232.00
23	4	58.00	461.03	443.61	453.29	267.00
24	4	36.50	446.30	410.97	382.40	235.00
30	4	45.00	524.12	386.06	393.12	284.00
Average		45.75	467.06	405.64	386.23	254.50
Group 4: Irregular						
12	2	49.50	606.94	447.50	320.08	343.00
18	3	68.00	617.80	477.42	446.74	337.00
25	4	55.00	626.32	511.26	321.67	323.00
26	4	69.75	641.24	605.34	329.23	324.00
29	4	73.75	598.10	507.58	404.85	346.00
32	4	40.50	552.54	367.28	310.23	290.00
36	4	61.50	604.85	503.05	346.10	329.00
Average		59.71	606.83	488.49	354.13	327.43



Illus. 4.12 *Welham Bridge. Plan and cross-sectional views of the sampled slag lumps arranged by groups (see text)*

(Al_2CaSiO_8). Calculating these components from the bulk chemical composition as per Morton and Wingrove and plotting them on a ternary phase diagram of the system returns the mineral region and the temperature conditions under which the theoretical slag composition was formed.

The ternary diagram in Illus. 4.14 shows the spread of the material from Welham Bridge once again viewed against a background plot of the comparative material. As expected all the samples lie well within the fayalite region of the diagram, clustering within a small discrete area with the exception of samples 23.2 and 30.2. Comparison with the other material highlights the close grouping of the Welham Bridge material which lies well within the regions covered by the other groups. From the diagram a working temperature of



Illus. 4.13 *Welham Bridge. Detail of the four identified slag groups. Dotted lines represent concentrations of solid slag; dashed lines represent a more random distribution*

Table 4.3

Welham Bridge. EDXRF bulk analysis. Results are averaged from 4 samples (figures in weight percent)

Sample	Group	Na_2O	MgO	Al_2O_3	SiO_3	P_2O_5	K_2O	CaO	TiO_2	MnO	FeO
1.1	1	-	-	2.68	22.72	1.31	0.90	1.45	0.07	0.75	69.81
3.1	1	-	-	2.59	21.24	1.72	0.37	1.61	0.19	0.98	70.51
8.1	1	-	-	2.92	21.82	0.80	0.37	1.47	0.21	1.43	70.15
19.1	1	-	-	2.96	23.22	0.92	0.46	1.54	0.20	1.31	68.42
28.1	1	-	-	2.50	19.15	0.88	0.38	1.74	0.24	1.53	72.39
9.1	2	-	-	3.06	22.84	0.99	0.38	1.39	0.14	0.53	69.83
37.1	2	-	-	3.37	21.95	1.06	0.46	1.46	0.10	0.58	70.24
23.1	3	-	-	2.15	20.84	0.59	0.33	1.19	0.13	1.70	72.70
30.1	3	-	-	3.46	28.70	1.07	0.65	1.41	0.14	0.96	62.72
12.1	4	-	-	2.83	29.16	0.43	0.98	0.81	0.10	0.51	64.81
18.1	4	-	-	2.56	25.84	1.55	0.26	1.15	0.10	0.72	67.30
29.1	4	-	-	2.72	26.12	1.35	0.90	0.67	0.14	0.42	66.45
32.1	4	-	-	2.87	25.26	1.45	0.42	1.39	0.14	0.88	66.84
30.2	-	-	-	4.94	38.07	1.24	1.10	1.92	0.30	0.79	50.87
23.2	-	-	-	4.51	33.62	1.18	1.16	1.84	0.36	0.82	55.65

around 1150° is indicated. This could be interpreted as illustrating a very tight control over the operating parameters within the furnaces or a reflection of the consistent use of the same raw materials.

4.3.2 Consideration of furnace types

The lack of any excavated structures at Welham Bridge requires that a consideration of furnace types must be based upon the form and dimensions of the recorded slag lumps.

The plano-convex material is well recorded throughout early iron smelting, forming in the base of the furnace and therefore adopting some of the furnaces' structural features. Given the available evidence it is not possible to argue whether the plano-convex bases point to the use of bowl or dome furnaces as is traditionally considered or whether they were formed in the base of a more efficient shaft furnace. From a consideration of the major and minor axial dimensions it is suggested that the bases are associated with furnaces of internal base diameters of approximately 300 to 400mm with a depth of 200mm. This is consistent with the reported furnaces sizes from a number of sites including those from Merioneth, North Wales (Crew 1991). The slag pieces do, however, appear generally smaller than those reported by McDonnell (1988) from excavations at North Cave, East Yorkshire. The range and mean dimensions of six furnace bottoms from this site are given as 540mm major diameter, 370mm minor diameter and 250mm depth. This appears more consistent with the size of the Welham Bridge group 2 material - the elongated furnace bottoms. Unfortunately the weights of the individual pieces were not reported for further confirmation of similarity. It seems probable, however, that the same furnace technology was in use at North Cave and at Welham Bridge with the elongated furnace bottoms forming within a similar furnace design to that described by Tylecote (1962) from Wilderspool furnace B. These dimensions are given as 750mm by 460mm with shafts standing to 310 to 460mm in height. Of particular note is the presence of the well formed depressions in the upper surface of example 37 tentatively suggesting that these features point to the use of a

Table 4.4

Welham Bridge. Electron microprobe analysis of the fayalite phase (figures in weight percent)

Sample	Group	Na_2O	MgO	Al_2O_3	SiO_3	P_2O_5	K_2O	CaO	TiO_2	MnO	FeO
1.1	1	-	0.39	0.25	27.64	0.57	-	0.40	-	1.24	69.49
3.1	1	-	0.66	-	29.03	-	-	0.27	-	1.23	68.50
8.1	1	-	0.25	-	28.90	-	-	0.54	-	2.10	68.02
19.1	1	-	0.64	-	29.06	-	-	0.48	-	2.77	67.00
28.1	1	-	0.50	-	29.03	0.29	-	0.52	-	2.50	67.08
9.1	2	-	0.71	-	28.65	-	-	0.43	-	0.81	69.38
37.1	2	-	0.60	-	29.01	-	-	0.47	-	0.74	68.90
23.1	3	0.21	0.30	-	28.98	-	-	0.45	-	2.54	67.35
30.1	3	-	0.80	-	28.11	0.34	-	0.19	-	1.39	69.17
12.1	4	-	0.24	1.13	29.91	0.25	0.40	0.39	-	0.78	66.58
18.1	4	0.13	0.43	-	29.31	-	-	0.36	-	1.14	68.47
29.1	4	-	0.56	-	28.71	0.10	-	0.38	-	2.77	67.34
32.1	4	-	0.33	-	28.84	0.28	-	0.42	-	2.20	67.89
30.2	-	-	0.65	-	29.11	-	-	0.24	-	1.53	68.14
23.2	-	0.15	0.59	-	29.16	-	-	0.54	-	1.43	67.81

double tuyère within the furnace structure.

The formation of the hemispherical class 3 material is a little more problematic. They have obviously been formed within a structure/pit some 450 to 550mm in diameter and 400mm deep; whether or not this was within a furnace is open to speculation. A consideration of the distribution of the internal features within the cross-section suggests an amount of the slag to be at a viscosity level capable of flowing into a pit, with presumably some fuel/slag debris already present, and with heat transfer properties which would allow the molten slag to cool at a rate whereby few gas bubbles or other extraneous matter were trapped. One possibility is that initial 'rakings' from the furnace into an adjacent pit were followed by a 'run' of molten slag, alternatively the slag may have formed within a furnace with a particularly deep, pit-shaped base, although there seems no parallel for this type. It is also possible to speculate further and suggest that the furnace could have been some form of slag-pit furnace as described by Tylecote and that the slag formed within a pit beneath the furnace rather than being raked or tapped into a pit adjacent to the furnace.

The larger slag pieces have been shown to be much less dense, more vesicular and incorporating a quantity of charcoal. The well defined curved edges to a number of them confirm their containment within a structure, whether a pit into which the material was raked or the furnace itself. If the curved surfaces reflect the sides of the furnace/pit the approximate internal diameter would be in the region of 650mm. This compares with some of the larger furnace remains recorded in Britain and more particularly Europe. The less dense nature of the material could perhaps be attributed to a less efficient smelting process than that producing the plano-convex bottoms and/or they are perhaps the material remaining within the furnace at the end of a longer smelting cycle. That the material was raked from the furnace into an adjacent pit whilst still fairly molten is perhaps the more attractive option as this avoids the need to explain how these large lumps of slag were removed from the furnaces once the smelt had finished.

4.3.3 Consideration of the ore source

The quality of the ore is of great importance for the efficient production of iron at all technological levels. A major factor which has a bearing on the identification of ore source and supply for a particular smelting industry is the scale of the industry itself, ie. whether it was a large scale producer and distributor of iron blooms etc., or whether it was one of a series of localized industries producing (perhaps even seasonally) only for the needs of the immediate community. A large scale producer would require regular large amounts of good quality ore and would therefore be involved in a wide scale organization with greater resources at its disposal whereas the localized industry, perhaps lacking these resources and connections, would need to utilize more easily accessible sources. Through the work of Crew (1991) and McDonnell (1988) there is an increasing awareness of the utilization of 'bog ore' for the production of iron at the smaller local scale. Weathered fragments (up to approximately 15kg) of possible bog ore are found widespread around the Holme area and a number of these samples were collected and analyzed in order to asses their suitability for smelting. The results are given in Table 4.8 and show a wide range of composition particularly in the iron oxide and silica content. This may be largely attributed to the difference in the weathered state of the samples which was confirmed by the identification (X-ray diffraction) of a major component in some of the samples as Goethite. The high silica content in samples 1 and 2 casts doubts as to their suitability as an ore for smelting and this is more so with the low iron and manganese content. Samples 3 and 4 show greater potential but still must be considered very low grade in comparison with instance the bog ore used by Crew in his smelting experiments which had a combined iron and manganese oxide content of over 84 percent and only 7 percent silica (Crew 1991)[1]. Included for comparison are the analysis of some Wealden iron ores (Worssam and Gibson-Hill 1976) which, although they show consistently higher iron oxide content

Table 4.5

Welham Bridge. Electron microprobe analysis of the 'glass' phase (figures in weight percent)

Sample	Group	Na_2O	MgO	Al_2O_3	SiO_3	P_2O_5	K_2O	CaO	TiO_2	MnO	FeO
1.1	1	0.76	-	17.08	26.57	6.49	9.21	5.69	0.37	0.02	33.82
3.1	1	0.92	-	18.26	39.99	8.48	8.05	8.51	0.63	0.03	15.14
8.1	1	0.51	-	17.42	39.60	0.56	14.20	0.17	0.40	0.28	26.86
19.1	1	0.62	-	17.49	32.05	10.60	3.65	11.44	9.03	0.69	14.42
28.1	1	1.53	-	16.71	35.61	6.70	6.58	7.91	0.45	0.38	24.13
9.1	2	0.96	-	16.58	34.28	5.10	2.12	7.88	0.86	0.61	31.59
37.1	2	1.22	-	17.63	36.88	4.88	2.66	7.29	0.83	0.52	28.10
23.1	3	1.00	-	14.03	39.58	2.56	2.33	4.41	1.43	0.43	34.24
30.1	3	1.01	-	14.13	39.91	1.24	2.63	2.62	1.66	0.18	36.62
12.1	4	0.97	-	12.38	40.63	3.05	1.97	4.67	0.89	0.61	34.82
18.1	4	1.02	-	11.51	42.54	4.32	1.99	5.74	0.51	0.65	31.71
29.1	4	0.92	0.21	8.06	36.01	2.03	1.52	2.43	0.37	1.00	47.44
32.1	4	0.91	-	10.59	39.68	2.92	2.08	3.85	0.77	0.74	38.45
30.2	-	1.08	-	16.63	44.02	4.26	2.62	6.81	1.32	0.63	22.63
23.2	-	1.05	-	14.45	41.29	3.62	2.20	5.47	0.90	0.60	30.43

an the Welham Bridge material, do vary a great deal in lica content. Although the samples of ore collected from the olme-on-Spalding Moor area were shown to be of a low rade there is no evidence to suggest that this is representative f the quality of ore available during the life of the industry. onsideration must also be given to the wide scale evidence or iron-working within the region (above Illus 2.25), the rge areas of bog within this area and the possibility that the ource of the good quality ore was worked-out. The ajor source of iron ore other than bog ore is found on the outh side of the Humber in the form of the Frodingham onstone beds. This could be considered as a ractical source of raw materials as the location of the Velham Bridge site would have provided access to the major aterway. However, experimental work suggests that those res could not have been smelted using the technology vailable (P. Crew *pers. comm.*).

.3.4 Quantifying the iron production

ome work has been done in attempting to quantify the iron roduction cycle notably through the work of Tylecote *et al.* (1971) and Cleere (1970), although this has concentrated production in slag tapping furnaces. More recent work by Crew (1991) has not only produced a quantification for the iron smelting process using non slag-tapping furnaces but has also extended the work into the smithing and production of iron bars. It therefore seems appropriate to utilize the results obtained from these experiments to gain an insight into the scale of production of iron as represented by the slag remains and thus to estimate the quantity of raw materials necessary for this industry. It should be noted that these figures are suggested only as guidelines in order to obtain a 'feel' of the scale of production as, amongst other factors, the efficiency of the smelt will be dependant upon the type of ore used.

Crew's figures for the smelting process show that 7.6kg of ore and 28kg of charcoal will produce a iron bloom weighing 1.7kg and leave 4.5 kg of waste slag. Using these figures in the calculation for the whole of the Welham Bridge material (*c.* 5400kg of slag) indicates that *c.* 9120kg of ore

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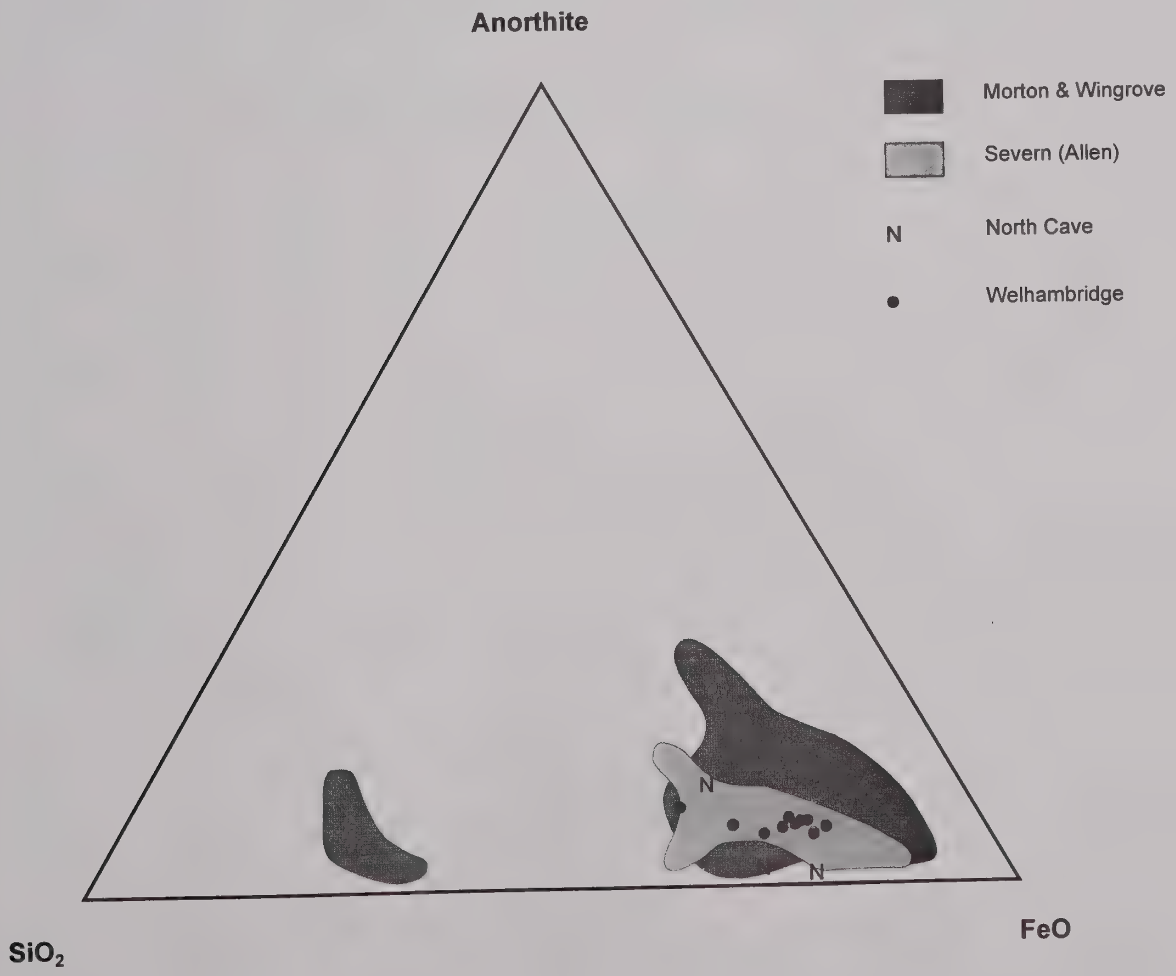
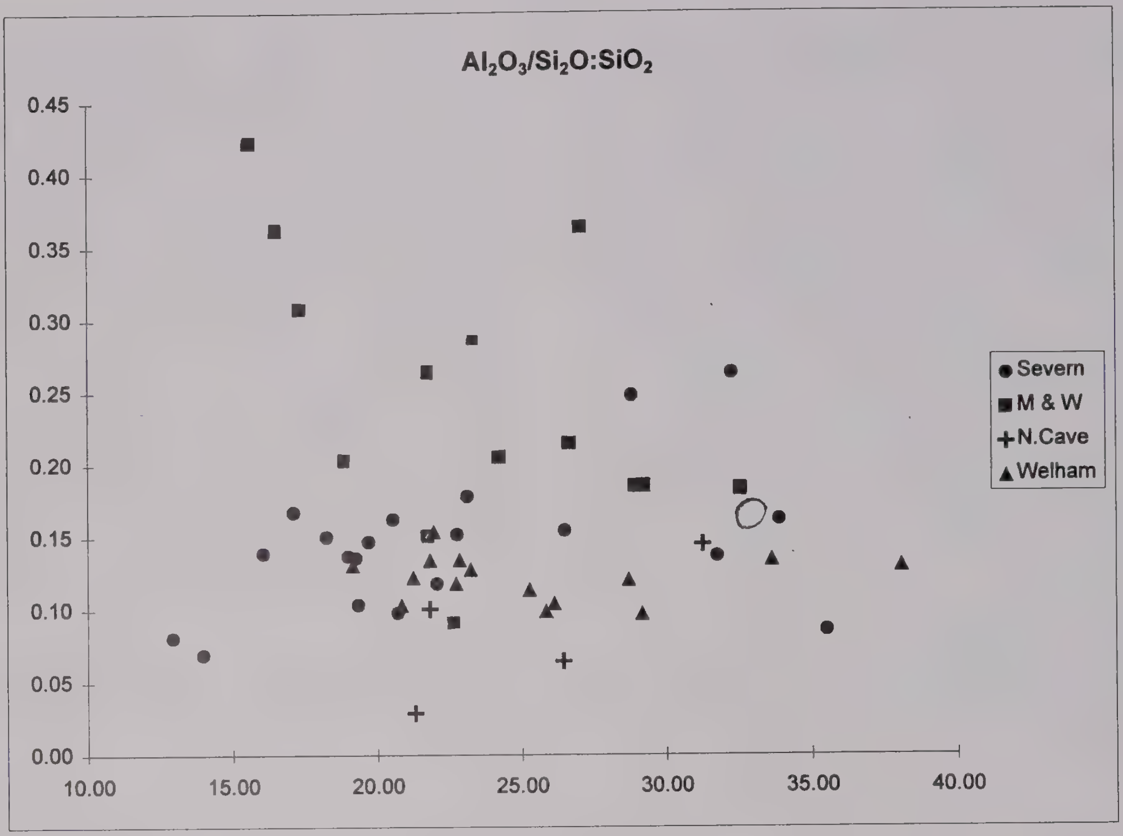
Footnote:

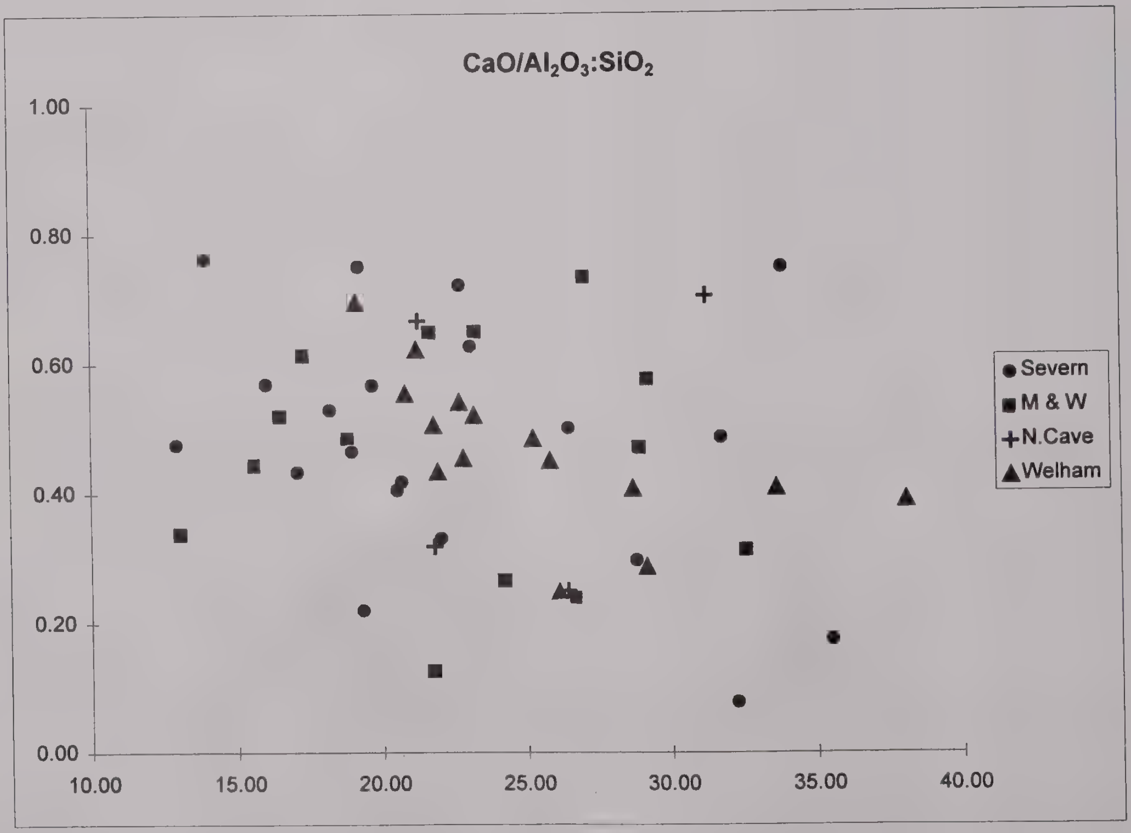
1. In April 1996 bog iron ore from Hotham Carr, near Holme-on-Spalding Moor, was successfully smelted by Peter Crew using a replica Iron Age furnace (Crew *pers. comm.*).



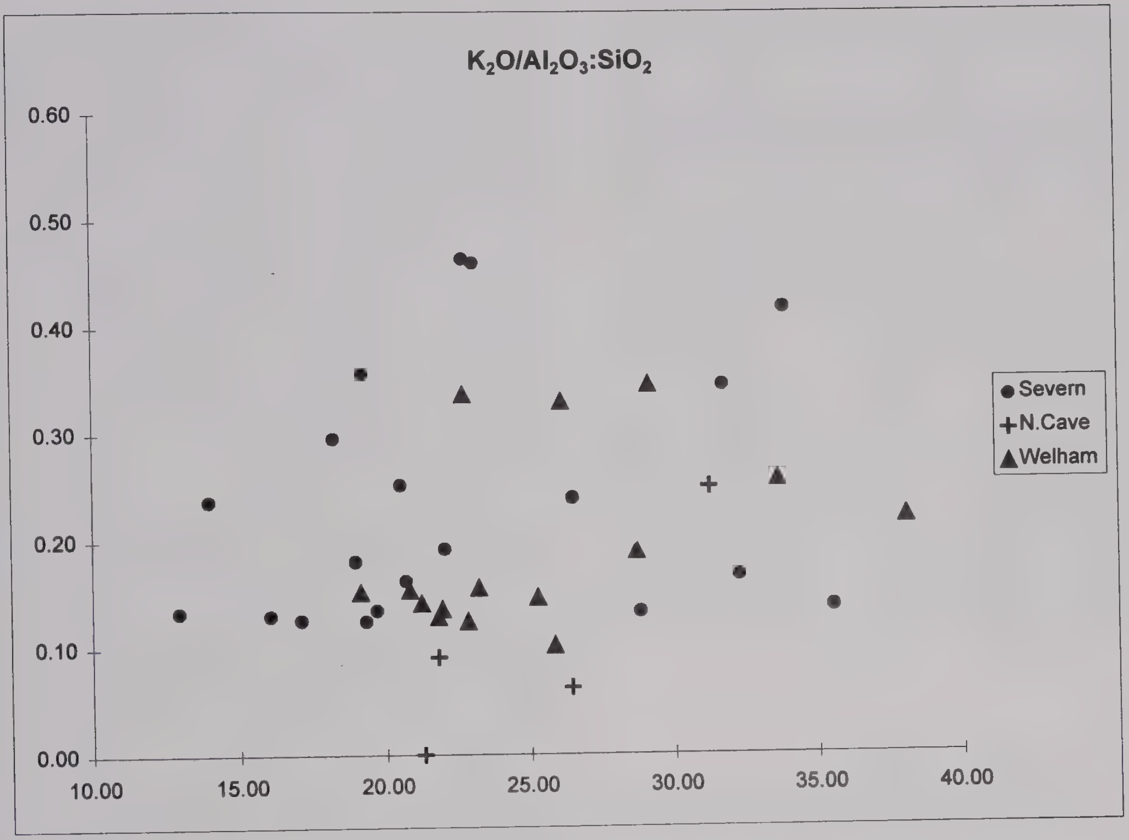
Illus. 4.14 *Welham Bridge. Ternary diagram showing distribution of slag against selected published analyses*



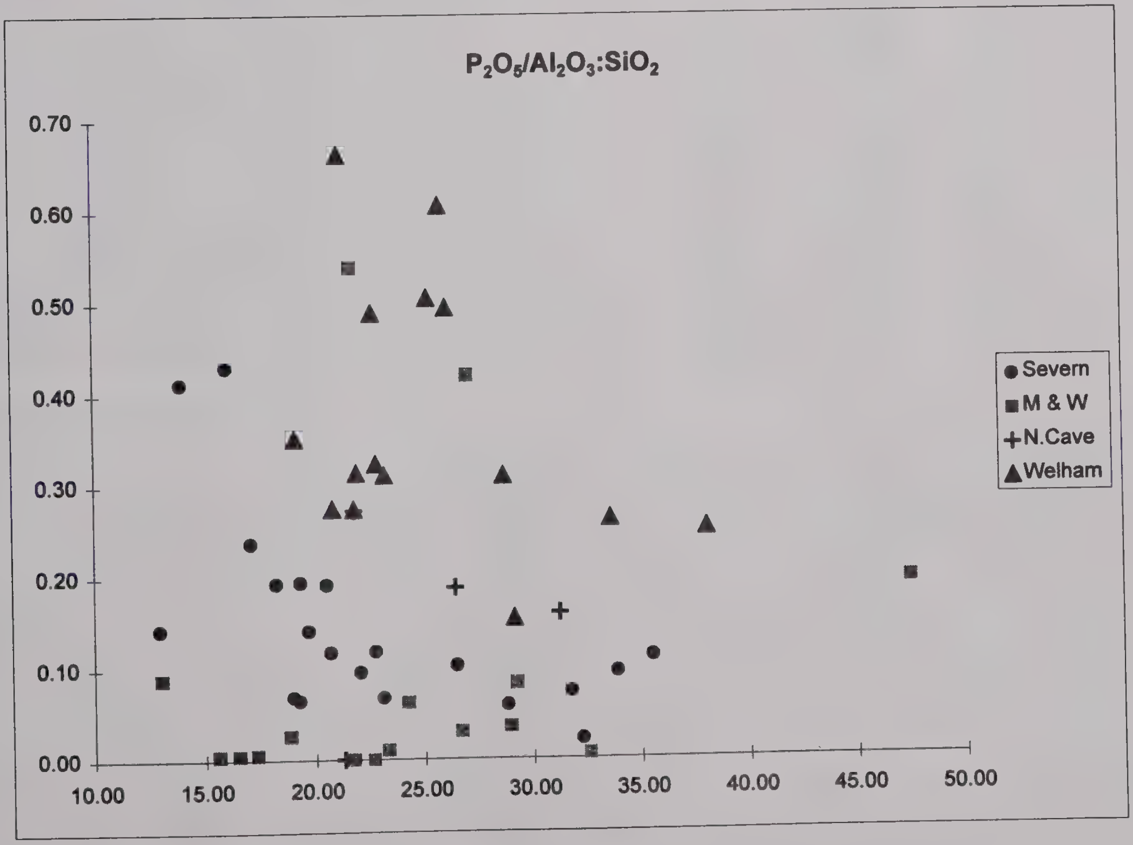
Illus. 4.15 *Welham Bridge. Variogram of aluminium:silicon oxide ratios against silica*



Illus. 4.16 *Welham Bridge. Variogram of calcium:aluminium oxide ratios against silica*



Illus. 4.17 *Welham Bridge. Variogram of potassium:aluminium oxide ratios against silica*



Illus. 4.18 *Welham Bridge. Variogram of phosphorous:aluminium oxide ratios against silica*

Table 4.6

Welham Bridge. Proportions of iron oxide, anorthite and reduced silica phases calculated from the bulk analysis (figures in weight percent)

Sample	Group	FeO	Anorthite	Reduced SiO_2
1.1	1	72.23	7.49	20.28
3.1	1	73.64	7.32	19.04
8.1	1	72.94	7.67	19.39
19.1	1	71.25	8.02	20.73
28.1	1	75.89	7.09	17.03
9.1	2	72.26	7.19	20.54
37.1	2	73.49	7.64	18.88
23.1	3	75.06	6.00	18.94
30.1	3	65.73	7.37	26.91
12.1	4	69.80	5.97	24.23
18.1	4	70.33	3.56	26.11
29.1	4	71.24	6.84	21.92
32.1	4	67.32	4.20	28.48
30.2	-	53.89	10.15	35.96
23.2	-	58.94	9.74	31.32

Table 4.7

Welham Bridge. Proportions of iron oxide, fayalite and glass phases from optical microscopy (figures in weight percent)

Sample	Group	FeO	Fayalite	Glass
1.1	1	22.00	65.50	12.50
3.1	1	18.00	68.00	14.00
8.1	1	20.00	72.00	8.00
19.1	1	22.00	71.00	7.00
28.1	1	20.00	75.00	5.00
9.1	2	19.00	74.00	7.00
37.1	2	17.00	79.00	4.00
23.1	3	55.00	36.00	9.00
30.1	3	37.50	51.00	11.50
12.1	4	9.00	76.00	15.00
18.1	4	8.00	81.00	11.00
29.1	4	19.00	69.00	12.00
32.1	4	15.00	73.00	12.00
30.2	-	0.00	75.00	25.00
23.2	-	5.00	68.00	27.00

and *c.* 33600kg of charcoal would have been used for the production of *c.* 2040kg of iron bloom. If the material is separated into the four identified slag types then it is possible to calculate the quantities associated with a single smelting operation. This is perhaps more significant when considering the plano-convex slag material as the level of confidence in assigning that material to a single smelt is higher. If the calculations are taken further - again based on the work of Crew (1991) the *c.* 2040kg of iron bloom could have produced *c.* 1080kg of billet which would have converted into *c.* 540kg of bar iron.

The full excavation and quantification of the Welham Bridge slag heap provides a good indication of the scale of iron production within the area. The total weight of the deposit was *c.* 5400kg, 970kg (17 percent) of which was sampled and recorded in detail. The examination suggests that this sample represents approximately thirty-five separate smelts. It is clear, therefore, that the complete slag heap represents a relatively small scale production system. If consideration is given to the range of different types of slag identified within the sample then the evidence points to a long term seasonal/occasional industry. Either the different forms represent a development of technology or, more likely, there is a continual change in work force and working practice. The analysis has shown that even given the restricted compositional range of iron-working slags the Welham Bridge material shows as a tightly grouped body of material suggesting that even though the nature of the furnace and working practice may have varied the industry was exploiting consistently the same sources of raw materials.

4.4 Discussion of iron production

The combined evidence of field-walking and excavation suggest that there was a significant iron industry in the study area. Since there are certainly additional sites as yet undiscovered in the vicinity outside the survey area, the scale of production exceeds that which we can establish. The evidence now available does, however, enable us to make some suggestions about the scale and nature of the industry. Nineteen major production sites have been found through field-walking (Section 2.3.5), with the example at Welham Bridge having been excavated.

The dating evidence is comparatively limited. Most of the major production sites are presumed to Iron Age given the general absence of associated Roman pottery from the field-walking The radiocarbon dates from the Welham Bridge excavation (Table 4.1) and the associations of smelting with the Iron Age settlement at North Cave (Dent 1989, 29-31) support this conclusion. These Iron Age dates cannot, however, be applied to all the production sites as work at both Hasholme Hall (Chapter 5.2) and Bursea House (Chapter 5.3) suggests that production continued into the Roman period. It does appear that production had passed its peak by the early Roman period since the quantities of slag associated with sites of this period are generally comparatively small.

During the period of production evidence about the local environment is limited but we can envisage a landscape in which there were relatively large areas of woodland (below Chapter 8.1). Management of this resource is likely to have provided the considerable amount of fuel needed for iron smelting. The question of ore source has already been considered (above Chapter 4.3) and, although we cannot be certain, there remains a strong probability that bog ores from the extensive wetlands in the immediate area provided the raw materials on which the industry was founded. The concentration of production sites along the edges of the creek system (Illus. 2.25) may thus be as much a result of proximity to the ores as of any desire to use the waterways for transport. Nevertheless it should be noted that the Hasholme boat, the use of which probably dates to the third century B.C., was capable of carrying between 3.5 and 8.6 metric tonnes of cargo (Millett and McGrail 1987, table 8), demonstrating that such craft could ave been of importance for both the import of raw materials nd the export of the finished iron.

Estimating the scale of production is problematic specially since we can only guess at the duration of the ndustry. It has been noted that the nature of the Welham Bridge slags is most consistent with a pattern of relatively small scale production over a period (above Chapter 4.3). Nevertheless the quantity of iron likely to have been produced by that site alone appears quite large. Extrapolating from the slag examined, Clogg has estimated that the total of iron bloom produced from the slag examined at this site was just over 2000kg with a product of *c.* 540kg of bar iron. To provide some comparison this quantity of bar iron represents the equivalent of over 800 iron 'currency bars' (based on the weight of 0.65kg per bar for the larger sword bars estimated by Crew 1991, 34). If the other eighteen sites already identified were producing similar quantities we can envisage a very substantial total production. This is especially impressive in the context of the limited volume of iron which has been recovered from excavated settlement sites of the period (Cunliffe 1991, 451-53). An approximate estimate of magnitude may be given by comparing the estimated total production of 800 'currency bars' from Welham Bridge alone with the total of 1462 such objects recorded from the whole of Iron Age Britain (Hingley 1990, 113 appendix). Whether production was short-term or continued through a long period, it is highly unlikely that it was intended solely for local consumption and a network supplying other parts of the region must surely be envisaged (see below Chapter 8.1).

The context of production in relation to settlement is also ambiguous. Despite the uncertainties, on balance it is most likely that the Welham Bridge production site lay close to a settlement. It has however been noted that the majority of the larger iron production sites are marginal to the main areas of settlement as shown by the aerial photographic evidence (above Section 2.2.3). This is perhaps consistent with the pattern of production already postulated for although neither specialist nor high volume, manufacture may have formed part of an economy which filled a particular niche in this damp and inhospitable environment. Thus we might envisage the iron-working sites as intermittently occupied by people who obtained their living from exploiting a range of different resources within the area (see below Chapter 8.1).

Table 4.8

EDXRF analysis of iron ore from the Holme survey area. Included for comparison are iron ore analyses from the Weald (Worassam and Gibson-Hill 1976). Figures in weight percent. na = not analysed

Sample	Na_2O	MgO	Al_2O_3	SiO_3	P_2O_5	K_2O	CaO	TiO_2	MnO	FeO	CO_2
Holme	-	1.13	0.72	26.54	0.31	0.26	0.43	0.04	0.07	28.12	na
Holme	-	1.59	0.74	27.37	0.45	0.41	0.63	0.07	0.11	29.56	na
Holme	-	1.25	0.63	18.43	0.47	0.24	0.85	0.10	0.52	38.90	na
Holme	-	1.20	1.30	20.94	0.40	0.39	0.69	0.08	0.72	36.79	na
Weald 1	-	0.25	8.24	26.10	0.49	-	0.86	0.60	1.29	39.51	20.25
Weald 2	-	1.76	2.64	6.46	0.65	-	3.87	0.21	2.32	48.24	32.70
Weald 3	-	0.18	4.67	4.13	-	-	3.80	0.10	0.46	53.50	29.50
Weald 4	-	0.25	6.90	9.49	-	-	5.20	0.23	0.71	41.76	31.82
Weald 5	-	2.00	1.10	10.30	1.00	-	3.30	0.20	1.60	50.60	-
Weald 6		1.10	12.07	60.75	0.15	-	0.47	0.62	3.30	15.46	-
Weald 2488	0.11	1.13	4.64	22.43	0.32	0.71	1.38	0.36	1.86	38.47	25.50
Weald 2489	0.11	0.52	9.56	23.96	0.48	1.16	0.30	0.55	5.88	35.70	0.97

CHAPTER 5

INDUSTRIAL SITES 2: POTTERY PRODUCTION

5.1 Pottery manufacture

Whilst pottery manufacture has been known in the Holme-on-Spalding Moor area for a considerable time, no large scale study of the industry has yet been published. It is clear that kilns were operating on a scale to supply more than local needs from the third to the mid/late fourth century A.D. Dr Jeremy Evans' unpublished thesis (1985; see also Evans 1988 and 1991) has provided a review of the evidence for this production and the distribution of the products throughout northern England and it is envisaged that this will be published in due course. This section is thus confined to a presentation of the results of our fieldwork.

Field-walking in the sample landscape block has identified a total of sixteen sites where there is certain evidence for pottery manufacture (above Section 2.3.3; Illus. 2.24). Excavation on kiln sites had previously taken place at Throlam (Gazetteer no. 77) in 1930 and at Hasholme Hall (Gazetteer no. 37) in 1970-72 but these excavations did not provide much evidence for the context of the excavated kilns. Equally, at the period during which they were excavated the methods of recovering botanical remains had not been developed, so little was known of contemporary agriculture around the production sites. In 1983-84 two opportunities were taken to extend our knowledge of pottery production by undertaking new fieldwork at Hasholme Hall (Gazetteer no. 37) and Bursea House (Gazetteer no. 15). The objective of this work was primarily to establish more about the economic, social and landscape context within which pottery was manufactured. In this chapter, summaries of this work are accompanied by reports on the finds. Since 1984 further occasional work has been undertaken at Bursea House and this is incorporated here. In addition two further kilns have been explored, at Arglam Grange Farm (Gazetteer no. 135) and at Skiff Lane (Section 2.3 postscript).

5.2 A re-assessment of the Hasholme Hall kiln site

The excavations at Hasholme (Gazetteer no. 37) in 1970-72 (SE 823328; Illus. 1.2) have previously been published (Hicks and Wilson 1975) but that report omitted some evidence, whilst details of the location were not provided. Subsequently, a geophysical survey of the area around the excavation was published providing further details about the site (Halkon 1983, fig. 6). During 1984 field drainage works were undertaken in the field in which the kilns had been found and, through the kindness of Mr R. Morris, Peter Halkon was able to record the features cut by the drainage trenches and sieve the spoil where they had cut through archaeological features. This produced a series of groups of pottery and other finds which it has been possible to relate to the plot of the aerial photographs of the site (Illus. 2.20 and 5.1). This plan was produced for the report on the excavation of the Hasholme Boat which lay only 200m to the north of the present site (Millett and McGrail 1987, fig. 2). The exavators of the 1970-71 were subsequently contacted and generously provided us with hitherto unpublished plans, photographs and notes. By combining these various strands of evidence it has been possible to locate precisely the earlier exavation and provide a re-assessment of the site.

The features found in the field drains were located by measuring their distance from the end of each trench, the position of which was located by survey. Drainage trench C also revealed the approximate location of the 1970-72 excavation. Every feature revealed by each drainage trench was given a reference number which is shown on Illus. 5.1. As the drains were very narrow only the larger features can be reliably expected to have been noted. Several of these features can be reasonably related to those found in the 1970-72 excavation (Illus. 5.4), the anomalies identified in the geophysical survey (Illus. 5.2) and the ditches plotted from the aerial photographs. These correlations are shown in Table 5.1 whilst the pottery from each feature from the field drains is summarized in Table 5.2 where an estimate is also given of the likely date of the assemblage based on the chronology established below (Chapter 5.6).

This aerial photographic plot demonstrates that the site comprised a multiple enclosure of the type discussed by Taylor (Section 2.2.3). At its core is a subrectangular enclosure (the Principal Enclosure) *c.* 25m across, the northern side of which has not been detected. On its south side, an outer concentric ditch (the Outer Enclosure) is also visible. To the north are traces of four east-west ditches and three on a broadly north-south alignment. The most easterly of these (the Enclosure Arc) curves westwards at its southern end towards the south-eastern corner of the main enclosure. Further fragments of a pair of east-west ditches are found in the eastern part of the field.

Most of these features produced little pottery in the

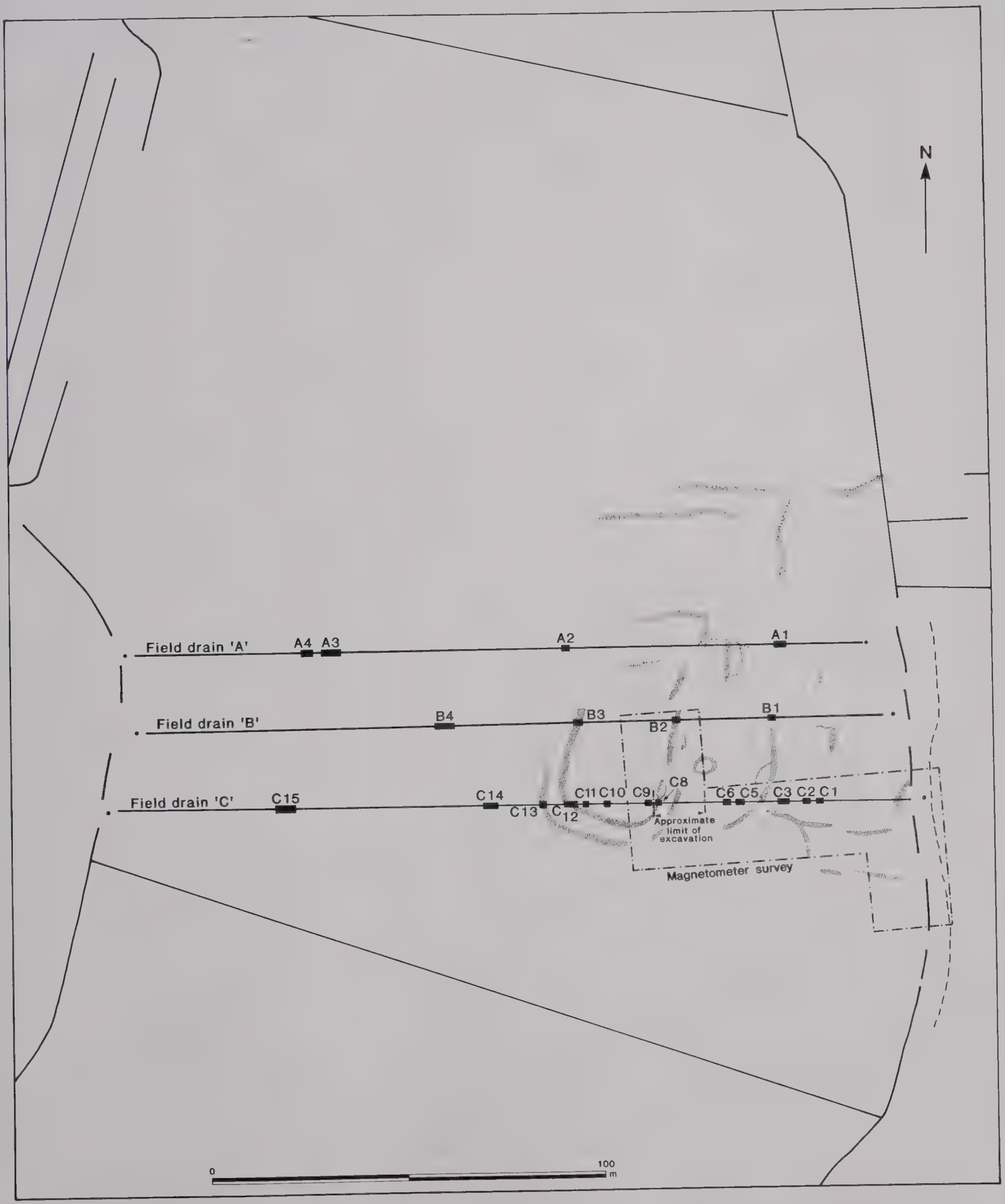
Table 5.1

Hasholme Hall. Correlation of features

Aerial photographs (Illus. 5.1)	1970-71 Excavation (Illus. 5.3 & 5.4)	1984 Field Drains (Illus. 5.1)
Principal Enclosure	Ditch 1	Features B2, B3, C8 & C12
Outer Enclosure	Ditch D	Feature C13
Eastern Arc	Ditch A also in trenches A, B & D	Features A1 & B1

1984 fieldwork but this information can be supplemented by the evidence of the 1970-72 excavation (Illus. 5.3 and 5.4).

The Principal Enclosure produced only a few sherds dated to the later Roman period from a single section. This is likely to have come from the sinkage into the upper fill. When excavated in 1970-72, the same feature, Ditch 1, produced a substantial assemblage of Iron Age tradition pottery plus a mortarium dated to A.D. 60-90 (Hicks and Wilson 1975, 52,



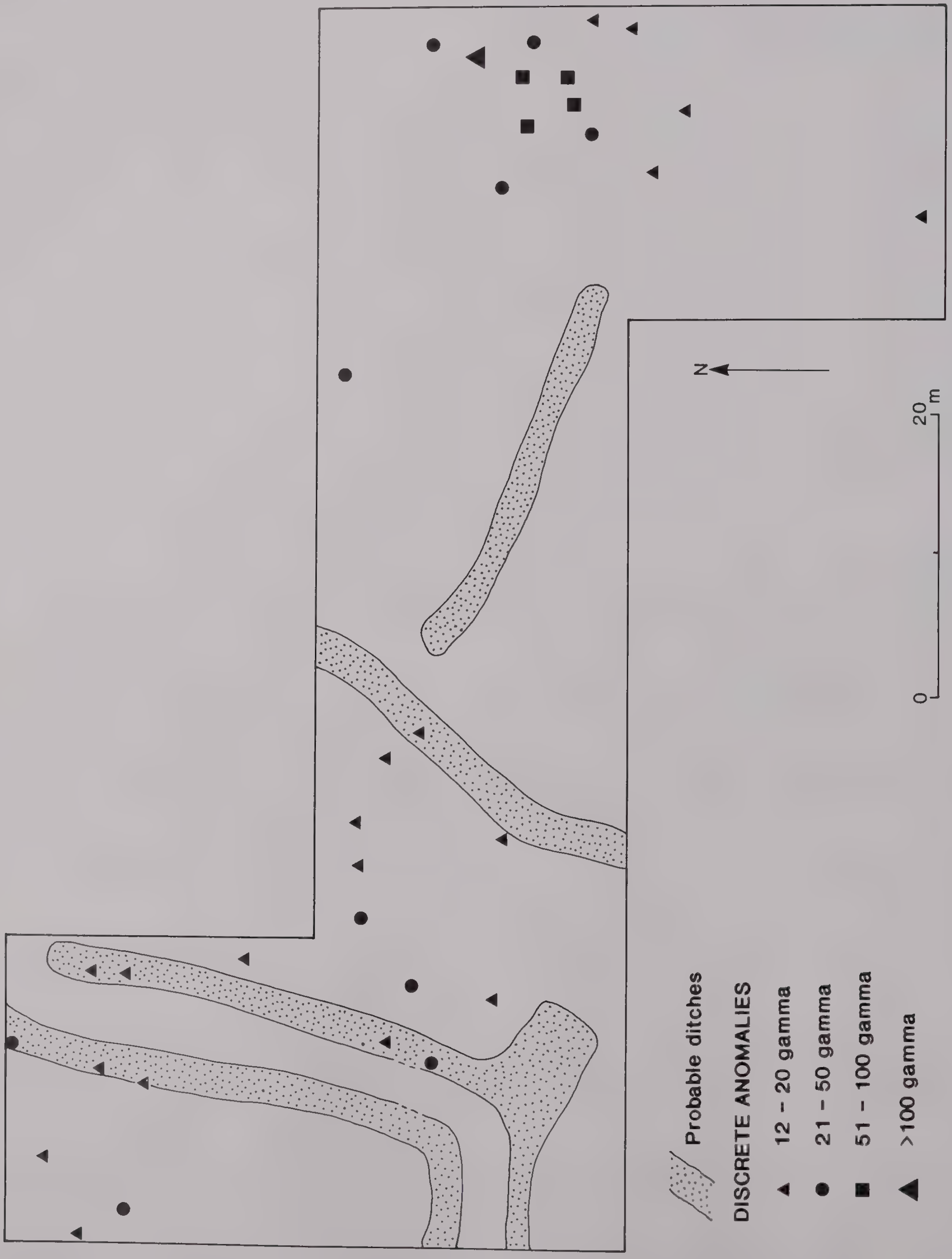
Illus. 5.1 *Hasholme Hall. Plan of the field drain trenches cut in 1984 showing the features recorded in relation to the crop marks (stippled), the 1981 magnetometer survey and the approximate limits of the 1970-71 excavation*

fig. 3) and a fine ware beaker of Pre-Flavian/Flavian date (*ibid.*, fig. 2).

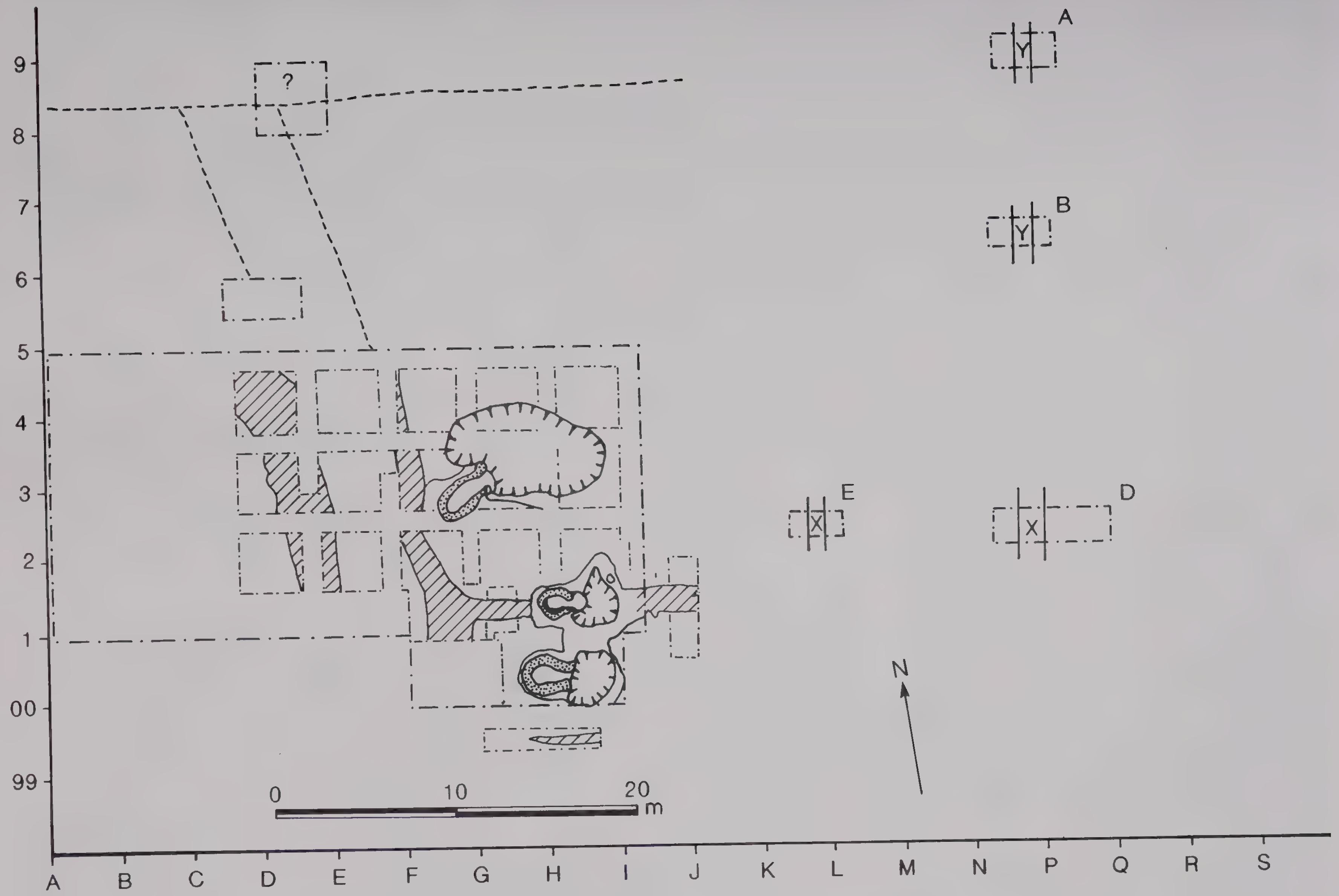
The Outer Enclosure produced no pottery in 1984. When excavated as Ditch D a large quantity of wasters was recovered from its upper fill (Wilson *pers. comm.*). This material was evidently derived from Kiln 2, which had been constructed in the top of Ditch A after it had gone out of use.

The excavated evidence (Illus. 5.4) also indicates that Ditch A (the Enclosure Arc) was broadly contemporaneous with these enclosures. A little later Roman pottery was recovered from the field drain section through this ditch. This is not inconsistent with the survival of this largely backfilled feature as a hollow into the Roman period.

These enclosures are thus best interpreted as being



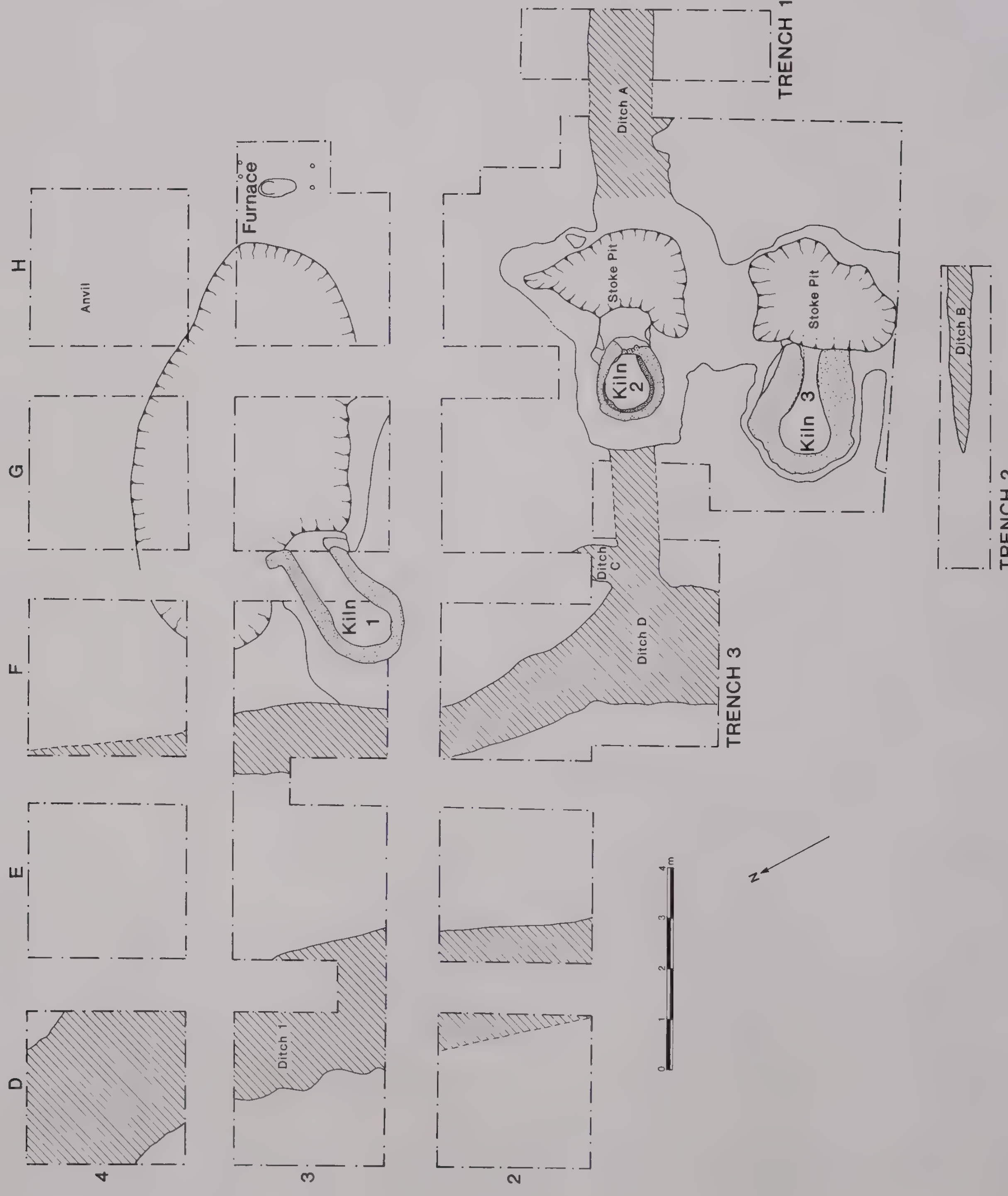
Illus. 5.2 *Hasholme Hall. Plan of the 1981 magnetometer survey (after Halkon 1983, fig. 6) For location see Illus. 5.1*



Illus. 5.3 *Hasholme Hall. Overall plan of the excavation grid and the trenches excavated in 1970-71. Redrawn from an original kindly provided by John A. Wilson*

of Iron Age or early Roman date, predating kiln 2 which was sited in depressions where the ditch fills had subsided. This provides a context for the excavated kilns which appear to have been situated outside the south-east corner of an enclosure of earlier date. Whether or not settlement continued in the area of this enclosure it would appear that the kilns lay near the margins of this much larger complex. The distribution of Roman pottery from the field drains suggests that the kilns formed one element in a more extensive settlement complex.

Iron slag recovered from a number of the features located in the field drains (Table 5.3) confirms the pattern of iron-working already discussed (Chapter 4.1). The relatively small quantities of slag which can be dated confirm that it



Illus. 5.4 *Hasholme Hall. Detailed plan of the principal trenches excavated in 1970-71. Redrawn from originals kindly provided by John A. Wilson*

Table 5.2

Hasholme Hall (1984). Pottery from features

Feature	Forms present	Probable date
A1	B1a; J2b	3rd - 4th century
A2	no forms	Roman
B1	no forms	Roman
C1	B6a	2nd - 4th century
C2	B1a; B1b; B1f; B7a; D1a; D6a; J1b; J1c; J2a; J2c; J5b	3rd - 4th century
C3	B6a	2nd - 4th century
C5	B6a	2nd - 4th century
C6	no forms	Roman
C7	B6a	2nd - 4th century
C8	J1b; J1c	3rd - 4th century
C9	B1a	late 3rd - 4th century
C10	no forms	Roman
C12	no forms	Roman

was being deposited until the later Roman period. This confirms the date suggested by the anvil found in square H4 (Illus. 5.4) previously published by Manning (1975). An iron furnace found in the eastern section of square H3 was excavated by cutting back the section. Information from a sketch plan has enabled this to be planned on Illus. 5.4 but no other information about it is available. Its location arguably suggests a later Roman date.

5.2.1 The kilns

The three kilns excavated at this site (Illus. 5.4) have previously been discussed by Swan (1984) and Evans (1985). Little new information is available so nothing can be added to their conclusions. Kiln 1 (Illus. 5.5) is typologically simple and of Swan's Linwood-type, with an oval firing chamber and fairly broad elongated flue facing slightly to the north of due east. The interior had been stripped out so nothing of the fittings survived. A large stoke pit lay in front of the kiln.

Kiln 2 (Illus. 5.6) was much better preserved but was smaller in size than Kiln 1. It was constructed in the top of Ditch A. It too was of Linwood-type, with a pair of clay pedestals running broadly parallel to the axis, surviving *in situ*. Additional clay slabs had perhaps originally spanned them to provide support for the pots being fired. This kiln had a shorter flue than Kiln 1 and a smaller stoke pit in front of it. Its axis was apparently determined by the ditch into which it was cut with the flue facing south-eastwards.

Kiln 3 (Illus. 5.7) was similar to Kiln 1 having also had its fittings stripped out although scars in the floor suggested the presence of a pair of pedestals (Swan 1984, fiche 679). It lay parallel to Kiln 2 and had a stoke pit of similar size to that found in front of Kiln 2.

Linwood-type kilns have a limited geographical distribution in the Lincolnshire and East Yorkshire area (Swan 1984, 122-23, map 13). Swan raised the possibility that two of the Hasholme kilns might be transitional in form between the Linwood- and Swanpool-types (*ibid.*, 123-24) although from the evidence now available it would seem clear that none had the integral pedestals characteristic of the latter form.

Little new evidence can be offered about the date of these kiln. On the basis of the associated pottery Swan (1984, fiche 678-69) suggested that all three kilns dated to the mid/late third to early/mid fourth century. The range of types arguably suggests a date in the earlier half of this range. As at Bursea House (below Chapter 5.3) the quantity of wasters recovered from the site perhaps suggests a lesser scale of production than that witnessed at Throlam (see Chapter 8.1).

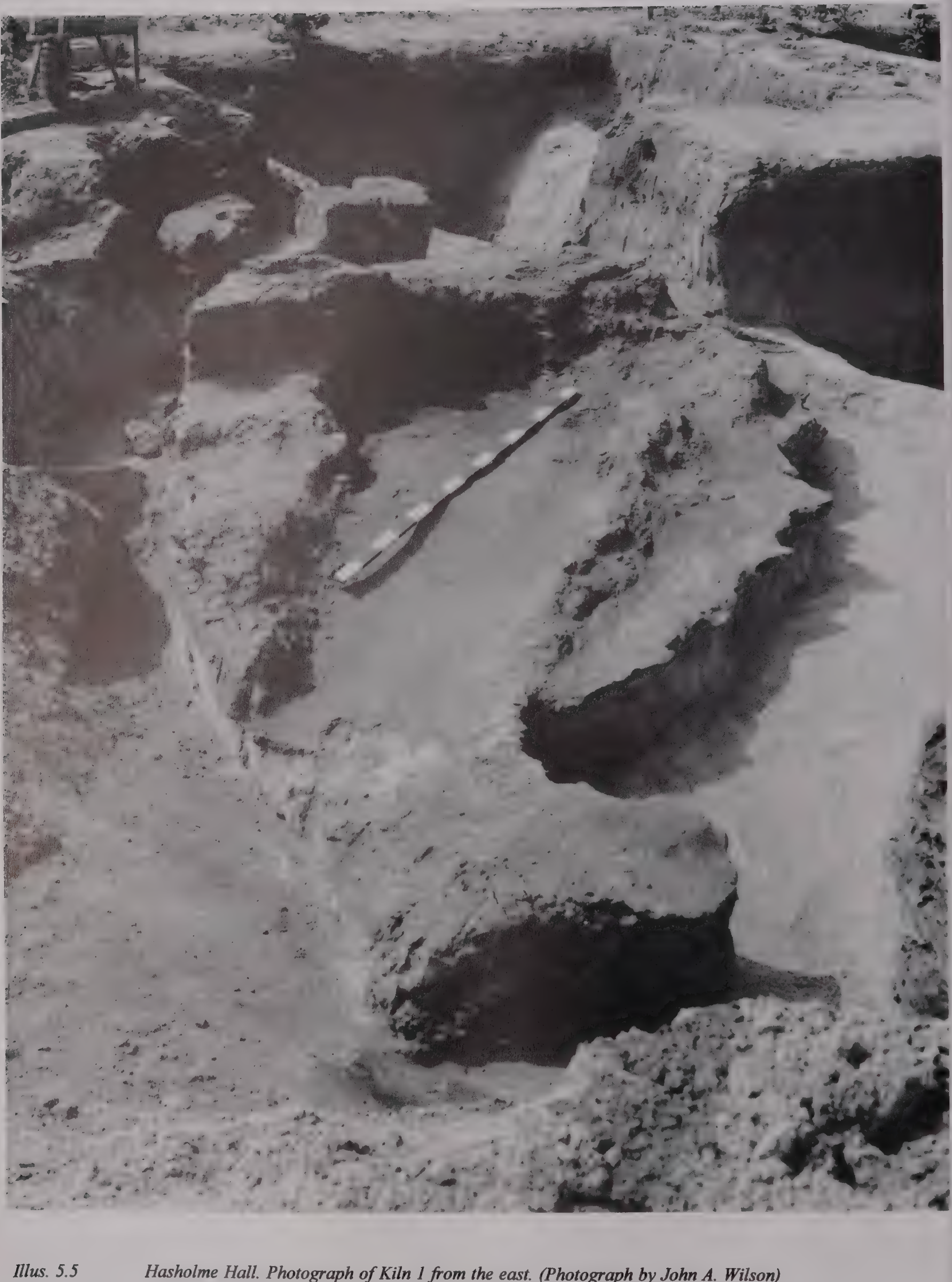
5.2.2 Synthesis

The available evidence suggests that the enclosure at the core of the site was in existence during the later Iron Age. The Hasholme logboat was found immediately adjacent to the settlement and this sank sometime after 323-277 B.C., most likely around 250 B.C. (Millett and McGrail 1987, 145). The excavated Iron Age tradition pottery found in the Principal Enclosure (Ditch 1) is similar to that from the logboat although it is clear that pottery in this tradition continued in use probably until the second century A.D. (below Chapter 5.6). The absence of kiln wasters from the Principal Enclosure suggests that this had been completely infilled before the kilns came into use. The kilns evidently belong to a phase when the Outer Enclosure and Eastern Arc (Ditches A and D) were still visible although partly filled. Their location in relation to the other features known from the aerial photographs suggests that they were peripheral to the settlement core, a situation that appears similar to that at Bursea House (below Chapter 5.3). The same is true of the iron-working activity evidenced by the smithing anvil and furnace. The Outer Enclosure and Eastern Arc (Ditches A and D) perhaps defined an eastern annex to the main enclosure in which this activity was confined although this is uncertain.

Table 5.3

Hasholme Hall (1984). Stratified iron slag (number of fragments)

Feature	Cinder	Undiagnostic iron working slag	Smithing slag	Smelting slag
B4	-	1	-	-
C2	-	1	-	-
C3	-	1	-	-
C4	-	1	-	-
C7	-	-	-	1
C9	1	-	-	-
C10	-	-	-	1
C12	-	2	-	-



Illus. 5.5 *Hasholme Hall. Photograph of Kiln 1 from the east. (Photograph by John A. Wilson)*

5.3 Excavations at Bursea House

5.3.1 Introduction

The concentration of evidence for pottery production at Bursea House (Gazetteer no. 15, SE 813337) has been known for some time (Hicks and Wilson 1975, 49; Halkon 1983, 16-20) largely through the enthusiastic interest of the landowner, Mr Alan Johnson. Through his good offices field-walking and geophysical surveys were undertaken in the early 1980s and a large scale research excavation was completed in 1983-84. In addition smaller scale work was undertaken in 1987 when a pipe trench was cut through part of the site and in 1991-92 when flower beds were to be relaid.

Illus. 5.6 *Hasholme Hall. Photograph of Kiln 2 from the south-east. (Photograph by John A. Wilson)*

The present report summarizes the results of all these pieces of work (Illus. 5.8).

Bursea House itself, evidently an early post-Medieval farmhouse house, lies on the top of a slight sand hill which rises to 5.5m O.D. It is at one of the best geographical locations in the vicinity and it seems likely that there has been a settlement on the site for a considerable period. The farm covers the ridge top so that the fieldwork reported upon here has generally been confined to the margins of the site.

The various geophysical surveys undertaken by Mr J. Pocock of Bradford University are summarized in Illus. 5.9 (Pocock 1983; Aspinall and Pocock 1988). These surveys show very clearly that the sand hill on which Bursea House lies forms the focus of a multiple enclosure complex of the type identified elsewhere in the survey area through aerial photography (above Section 2.2.3). The intensity of activity focused here means that detailed interpretation of the ditches located by geophysics and excavation is as yet impossible although the general character of the site is clear.

Excavation trenches were opened in three principal areas (Illus. 5.8). The main excavations were concentrated in Area A (Illus. 5.10). Here, in 1983, a trench was opened along the southern edge of the arable field which lies immediately to the north of the farm. This was designed to establish the context of the finds distribution plotted in earlier fieldwalking (see Halkon 1983, fig. 5). The 1983 trench had two extensions cut southwards into the bank which defined the boundary between the farm and this field. These were designed to explore areas where Alan Johnson had previously recovered finds which suggested the presence of kilns. Their success in locating kilns led to the extension of the trenches on the bank during the 1984 season. The excavations in this area were confined by the need to work around the growing trees. In that season two further trenches (A2 and A3) were also opened between 25m and 35m to the south with the intention of sampling cultivated areas which had also produced surface evidence of kiln debris. Further work in Area A was undertaken in 1987 when a pipe trench dug across the area led to the discovery of a ditch and other features. This pipe trench was itself recorded and Area A1 was opened to explore further the features revealed.

Area B was excavated in 1983 50m to the east of the the principal trench in Area A (Illus. 5.8), in the corner of the same field. It was located to investigate a major magnetometer anomaly located in one of Mr Pocock's surveys. In the event, the trench revealed only a backfilled pond of relatively recent date which contained a sheet of corrugated iron roofing.

Area C lay to the south of Bursea House in part of the garden (Illus. 5.8). Here limited excavations in 1991-92 revealed an east-west ditch approximately 3m wide filled with a considerable quantity of Romano-British pottery and kiln debris dated to the late third-fourth century A.D. (Illus. 5.11). Another gully may perhaps represent a constructional beam slot but an insufficient area was excavated for any detailed interpretation to be offered.

The excavations of 1983-84 were principally undertaken by students from Durham University, supervised by Andi Dutton, Simon James and Harvey Watt in 1983, and by John Creighton, Sue Gill, Peter Stephens and Charlotte Walton in 1984. The 1987 and 1991-92 excavations were the work of the East Riding Archaeological Society. Most of the phasing the 1983-84 excavations was undertaken by John Creighton who also processed the pottery (below Chapter 5.6).

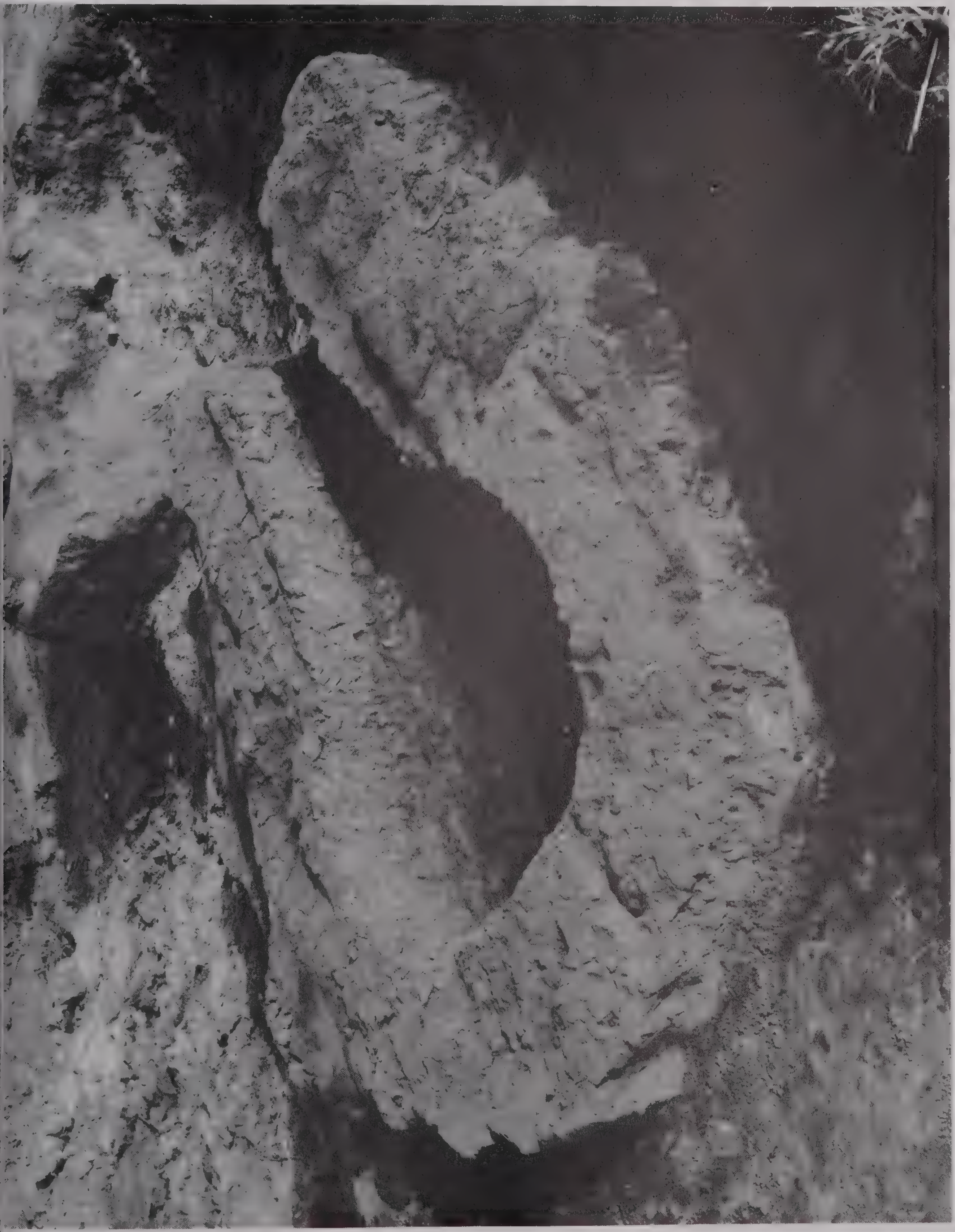
5.3.2 The excavated sequence in Area A

This report is concerned principally with the larger scale excavations undertaken in Area A during 1983-84 (Illus. 5.8 and 5.13). The results of work in 1987 and 1991-92 are related to this sequence where appropriate (Section 5.3.3). The site sloped from south to north with the ground surface at trenches A2 and A3 being at *c.* 5.5m O.D. whilst that to the north of Ditch 3 in the main area lay at *c.* 4.4m O.D. The area excavated lay on aeolian sand which had suffered from considerable disturbance. In the northern and southern parts of the excavated area the land had been heavily cultivated and there was considerable evidence of erosion with the grey sandy topsoil directly overlying the yellow natural sand. In these areas there were also a large number of mole holes which had carried the topsoil down for some depth into the subsoil. Beneath the trees in the central part of the excavated trench there was no evidence for ploughing and this accounts for the excellent survival of the latest of the kilns (below Period D). However, in this zone tree roots had broken up the stratigraphy and there was also extensive evidence for animal burrowing in the soft sand. These two problems meant that even here it was extremely difficult to identify feature edges with confidence. The phasing was also made difficult by the complex intercutting ditches which dominated the stratigraphy (Illus. 5.12 and 5.13). The whole area was rich in pottery and it was hoped that the stratigraphic sequence revealed would help clarify the chronology of the pottery produced in Holme-on-Spalding Moor. However, despite our ability to provide a reasonably secure stratigraphic phasing for the excavations there was little discernible difference between the pottery types represented through most of the sequence and almost no non-local pottery was recovered (below Section 5.6.3). Any subtle patterning may have been obscured by the mixing between layers caused by disturbance but this seems highly unlikely to account for the general homogeneity of the assemblage through the sequence. It is most likely that after the first phase, the sequence identified through our stratigraphic analysis was confined to a relatively short timespan. Throughout this summary of the stratigraphy the suggested dates are based on those provided in the pottery report (below Chapter 5.6).

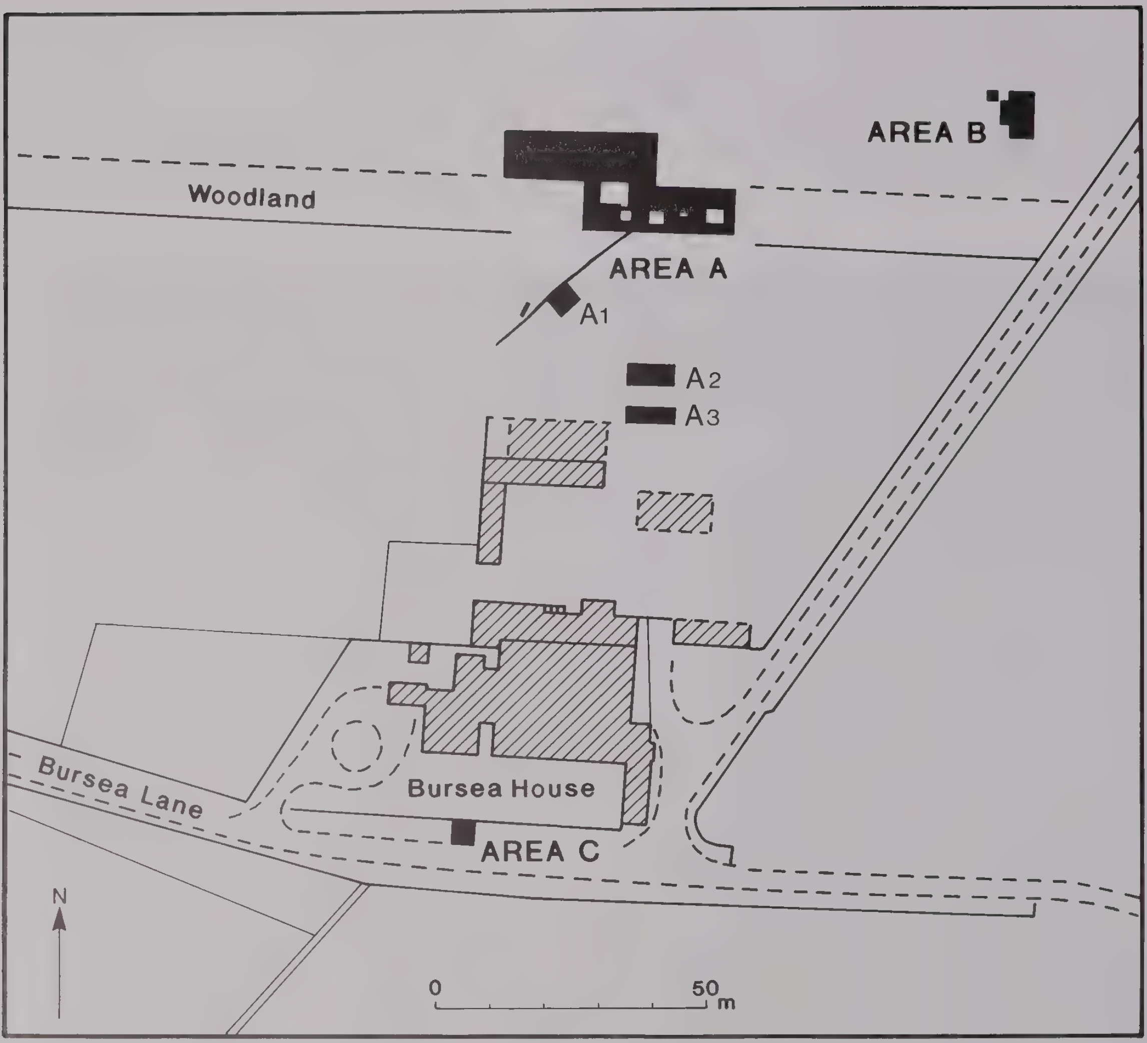
Period A

The stratigraphically earliest feature in the principal excavation area (Illus. 5.14) was Ditch 1. This ditch was *c.* 1.5m wide and *c.* 0.6m deep with a broad 'U'-shaped profile (Illus. 5.27). A north-south length of approximately 10m was investigated as well as the corner where it turned eastwards through a right angle. The latter sector had been truncated by a later sequence of ditches, but there is little doubt that the feature originally continued eastwards for some distance. There was no evidence for any northward continuation of the ditch at its angle. To the south of the principal area the geophysical survey apparently reveals that it continued *c*. 5m further to the south. It seems to have terminated before the pipe trench (Illus. 5.12). This ditch is most likely to represent the north-west corner of an enclosure located on the northern slope of the sand hill.

This ditch contained pottery which dates no later than the third century A.D. and is more likely to be of first- to second-century date. Contemporaneous pottery was also



Illus. 5.7 Hasholme Hall. Photograph of Kiln 3 from the west. (Photograph by John A. Wilson)



Illus. 5.8 Bursea House. Overall plan showing the location of the excavated areas (shown in solid black)

recovered from the substantial east-west ditch (Ditch X) located in trench A3, 25m south of the main area (Illus. 5.12). This was more than 1.8m wide and *c.* 1m deep with steep sides and a flat bottom. Its profile demonstrates that it had been recut on at least one occasion (Illus. 5.27). Its extent was not established but it is possible that it represents the southern edge of the Ditch 1 enclosure. If this interpretation is correct then it would have formed a rectangular enclosure *c.* 36m north-south. Pottery of probable first-century A.D. date also came from Ditch Y in Trench A1 (Illus. 5.12 and 5.15). It was insubstantial in the main trench of Area A1, being 'U'-shaped, *c.* 1m wide and *c.* 0.4m deep, but deepened to the west where it was sectioned on the opposite side of the pipe trench; here it was in excess of 2m wide and *c.* 1.2m deep. This ditch probably forms one side of a second enclosure to the west.

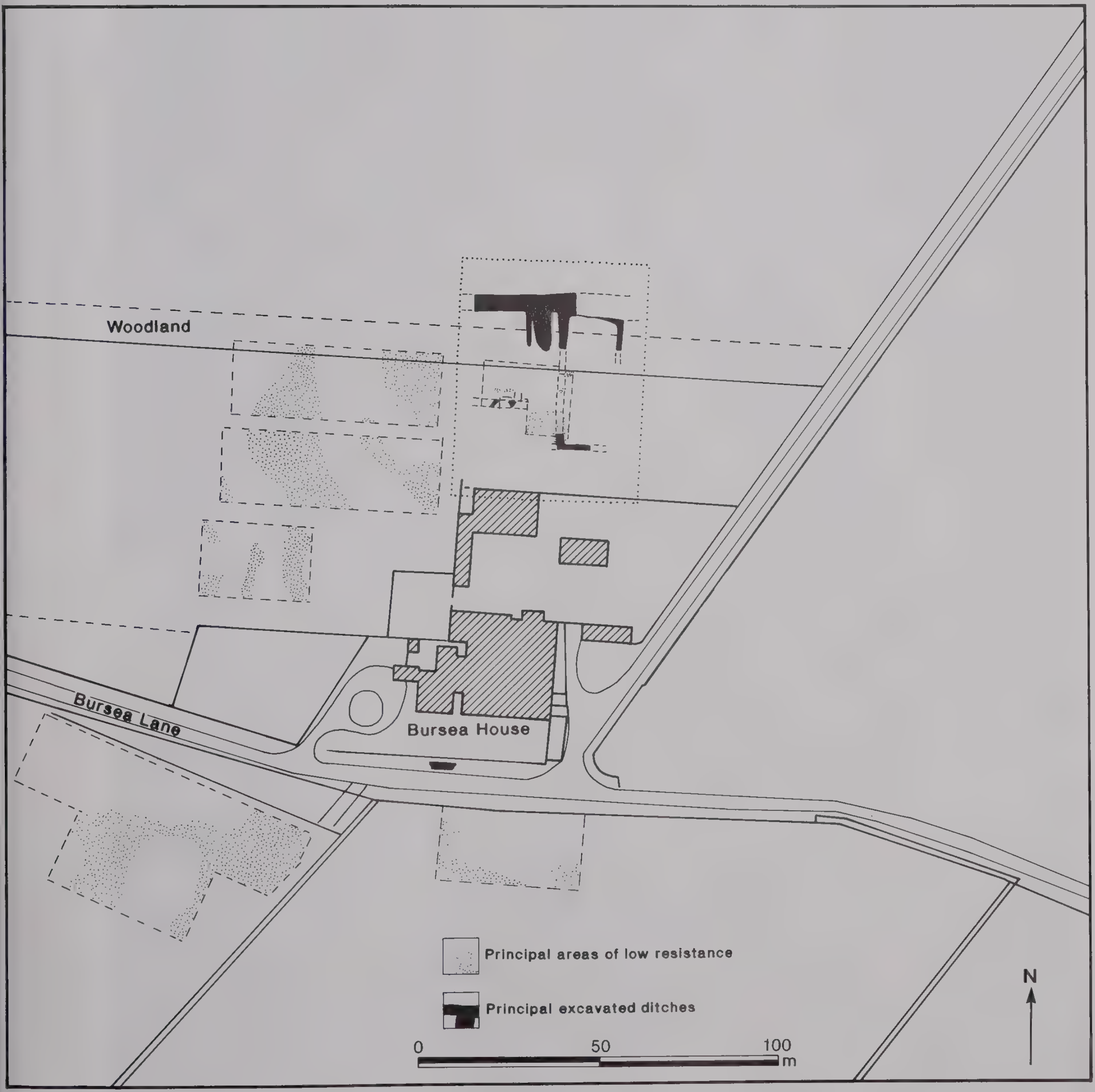
Period B

At some stage, whilst Ditch 1 was still visible although partly filled, Ditch 2 was dug (Illus. 5.16). This was a slighter feature only *c.* 0.5m wide and 100mm deep (Illus. 5.27) which lay parallel to Ditch 1 and *c.* 4.5m to its west. At the higher southern end of the trench there was little trace of it, but it widened and became deeper to the north before turning westwards and disappearing under the edge of the trench. Just to the east of its north-south section were four post holes, *c.* 1.8m apart, forming a slight arc with a beam slot adjacent to the northerly pair. The deposits into which they had been cut were truncated and survived only in a limited area so interpretation is difficult, but the northwards fall on Ditch 2 suggests that it was perhaps a drainage gully. The post holes arguably represent a structure but if Ditch 1 remained visible as a surface depression, there would be space for only a narrow building perhaps 2.5m wide on a north-south alignment. An alternative and more likely explanation is that the post holes formed a boundary fence associated with Ditch 2.

The pottery from this phase suggests a date in the early third century A.D. The layout of Ditch 2 mirrors the enclosure of Period A to the east with a downslope south-north ditch turning to the west at the same point that Ditch 1 turns east. This suggests an enclosure laid out in relation to the existing topography. Nothing survives to suggest its function.

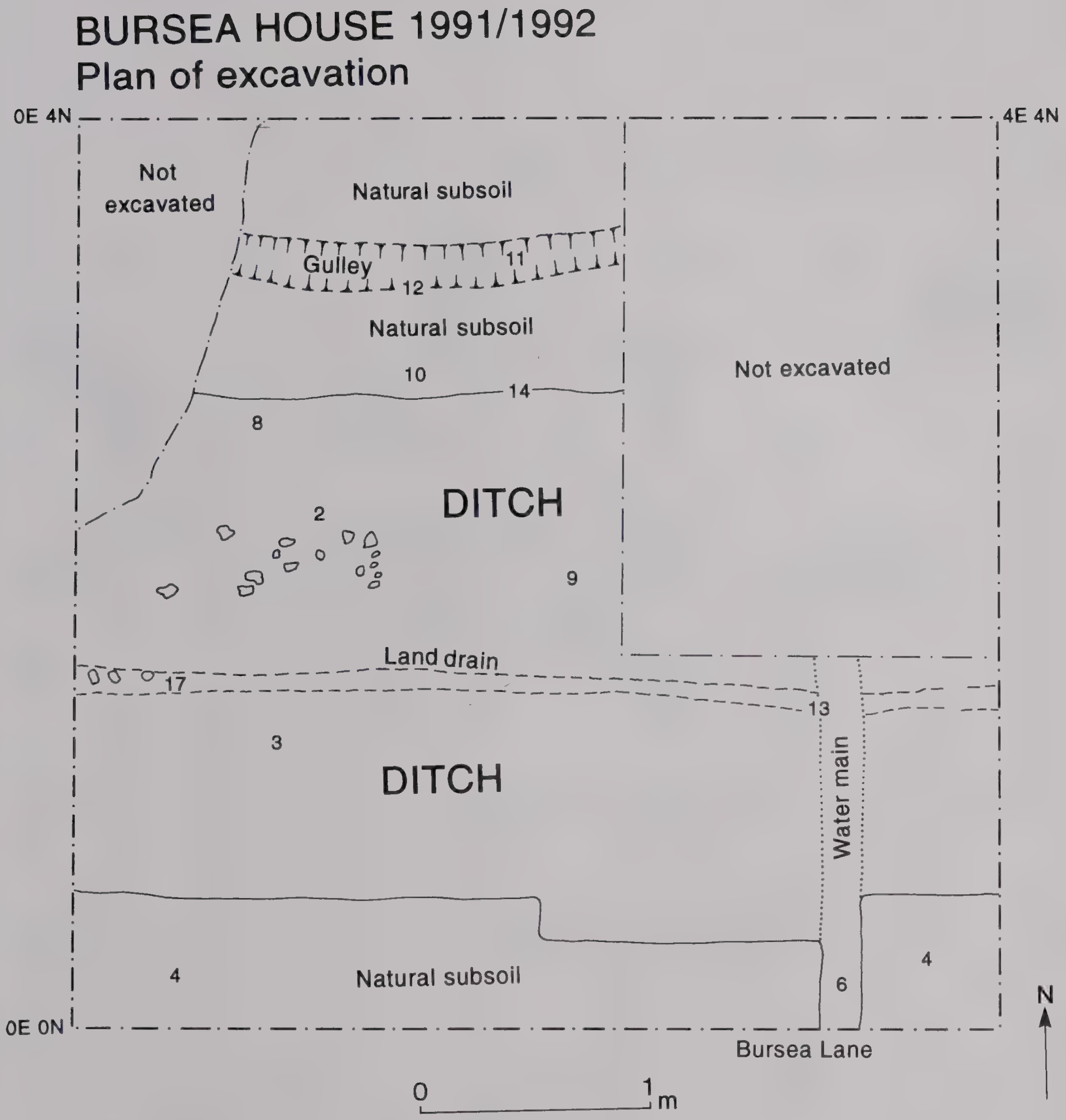
Period C

In this phase (Illus. 5.17) the first of the major east-west ditches (Ditch 3) was cut across the northern part of the excavated area immediately to the north of the line of the Period A and B east-west ditches. The set of features on this alignment had been recut on several occasions and presumably continued to be of significance throughout Period D. Ditch 3 itself was steep sided, *c*. 3m wide and *c*. 0.8m deep (Illus. 5.29). Its line remained as a principal boundary through most of the rest of the sequence (and indeed remained visible into the twentieth century) although its frequent recutting makes detailed phasing difficult. It is notable that the east-west line of Ditch 3 is deflected northwards towards the eastern end of the trench, presumably so that it would avoid the still extant eastward return of Ditch 1. This, and the way that it respects the line of Ditch 2, suggests a broad continuity of the earlier enclosure boundaries. Later


Woodland
Bursea Lane
Bursea House
Principal areas of low resistance
Principal excavated ditches
0
50
100
m
N

Illus. 5.9 *Bursea House. Plan of the main excavated features in relation to the principal features located by resistivity survey*

Illus. 5.10 *Bursea House. General view of the ditches in the northeast corner of Area A as excavated in 1983, viewed from the southwest. (Photograph by Martin Millett)*

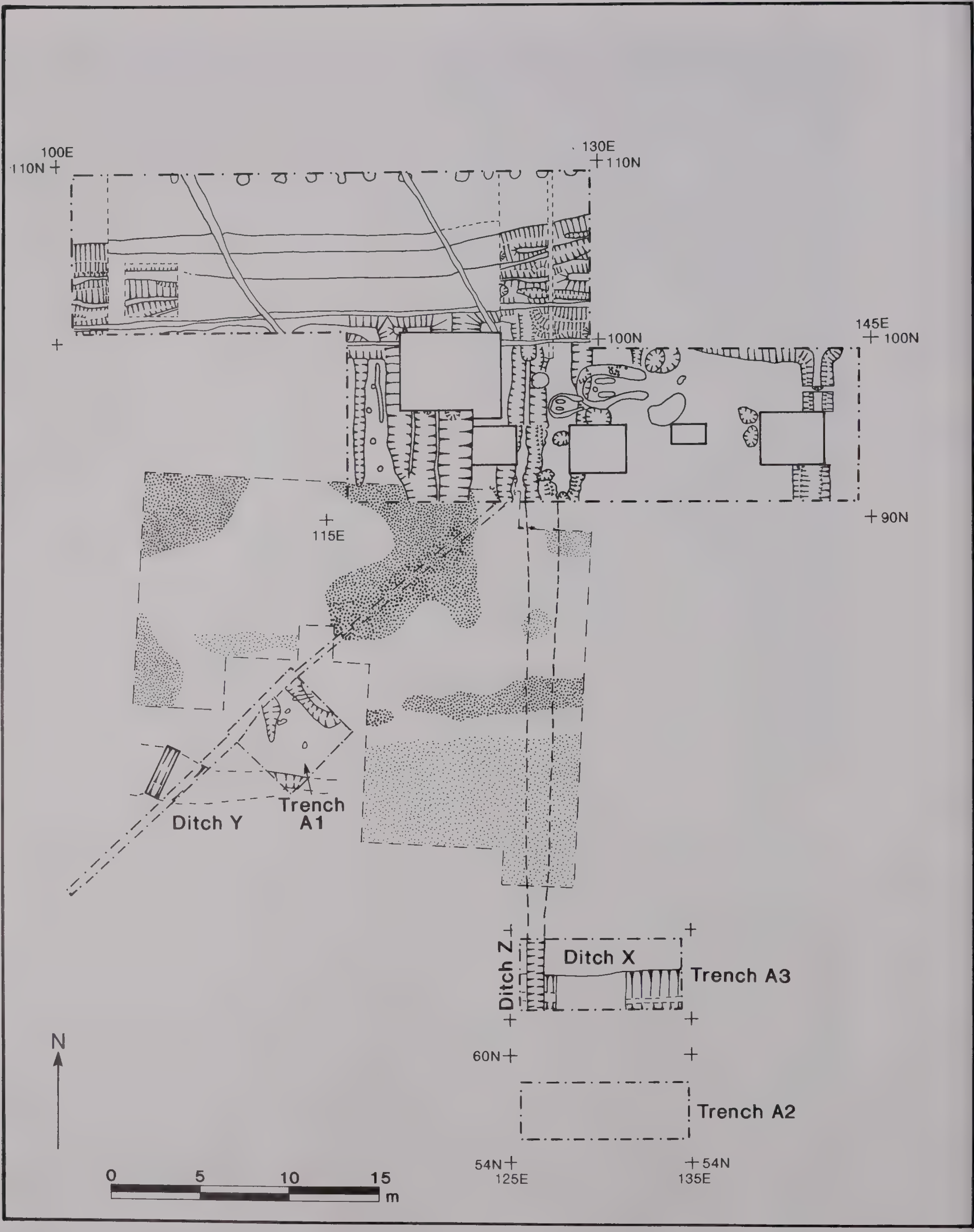


Illus. 5.11 *Bursea House. Overall plan of the features exposed in Area C (for location see Illus. 5.8)*

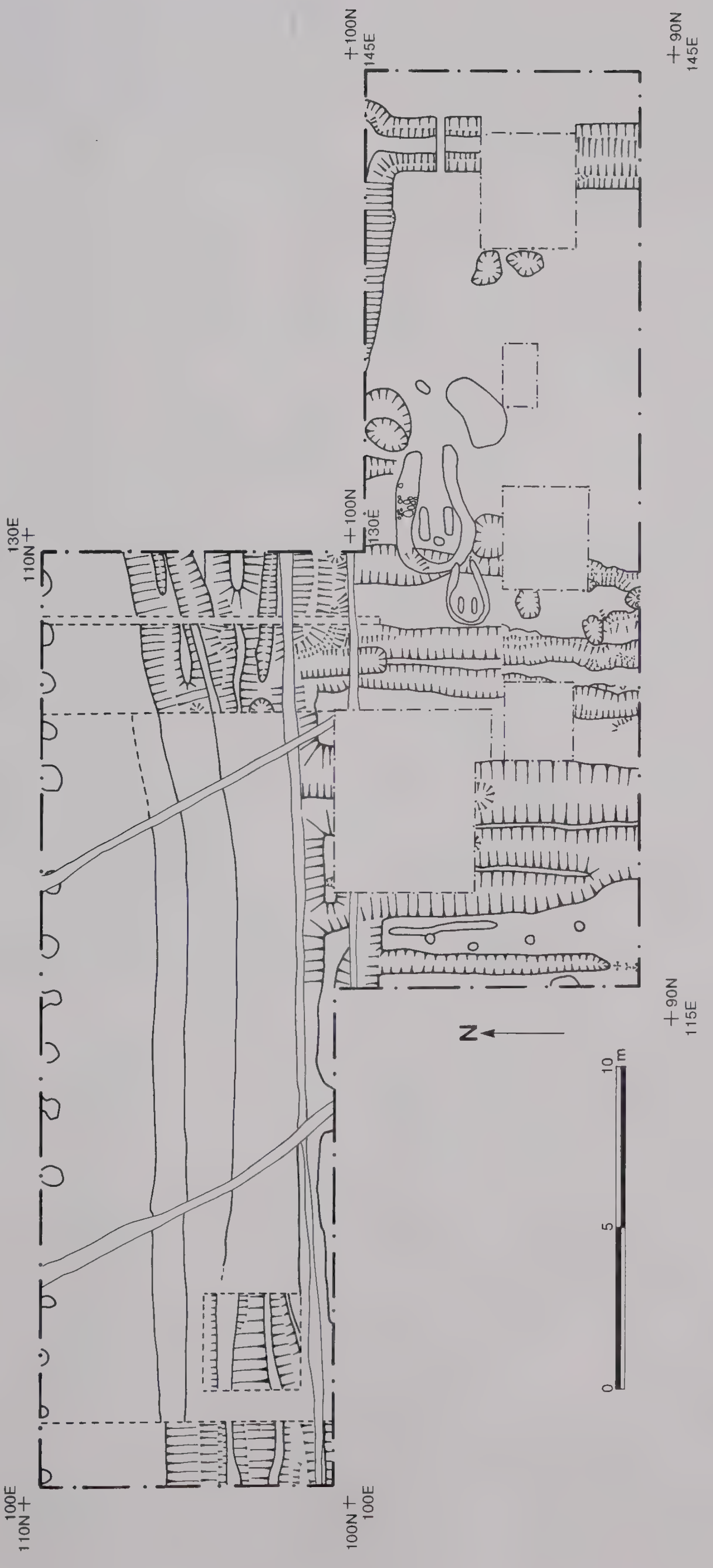
recuts have obscured the relationship between Ditches 3 and 4 although it appears that they must be broadly contemporaneous. Ditch 4 represents the first of a series of drainage ditches apparently cut to drain from south to north carrying surface water into Ditch 3. Like Ditch 2 in the previous phase, these features all deepened northwards with the fall of the ground. In the more southerly part of the trench where its section was well preserved it had a 'U'-shaped profile and was *c.* 0.5m wide and 0.3m deep (Illus. 5.27). Where it was cut by Pit 2 (Illus. 5.28) it was wider (*c.* 0.8m) but appears slightly shallower because of truncation. Although located further to the east than the north-south ditches of Periods A and B it does maintain approximately the same boundary line.

Nothing is known of the interior of the western enclosure but the excavated sequence in the eastern compound does begin in this phase (Illus. 5.18). The only excavated feature of this period was Pit 1, which lay in the northern part of the trench (Illus. 5.29). It consisted of a main pit at the western end, which was *c.* 1m long by 1m wide, steep sided and *c.* 0.6m deep. Its fill comprised sand mixed with much charcoal, suggesting that the pottery production evidenced in the next phase might already have begun nearby. The pit was extended by another *c.* 1m to the east by a shallow shelf.

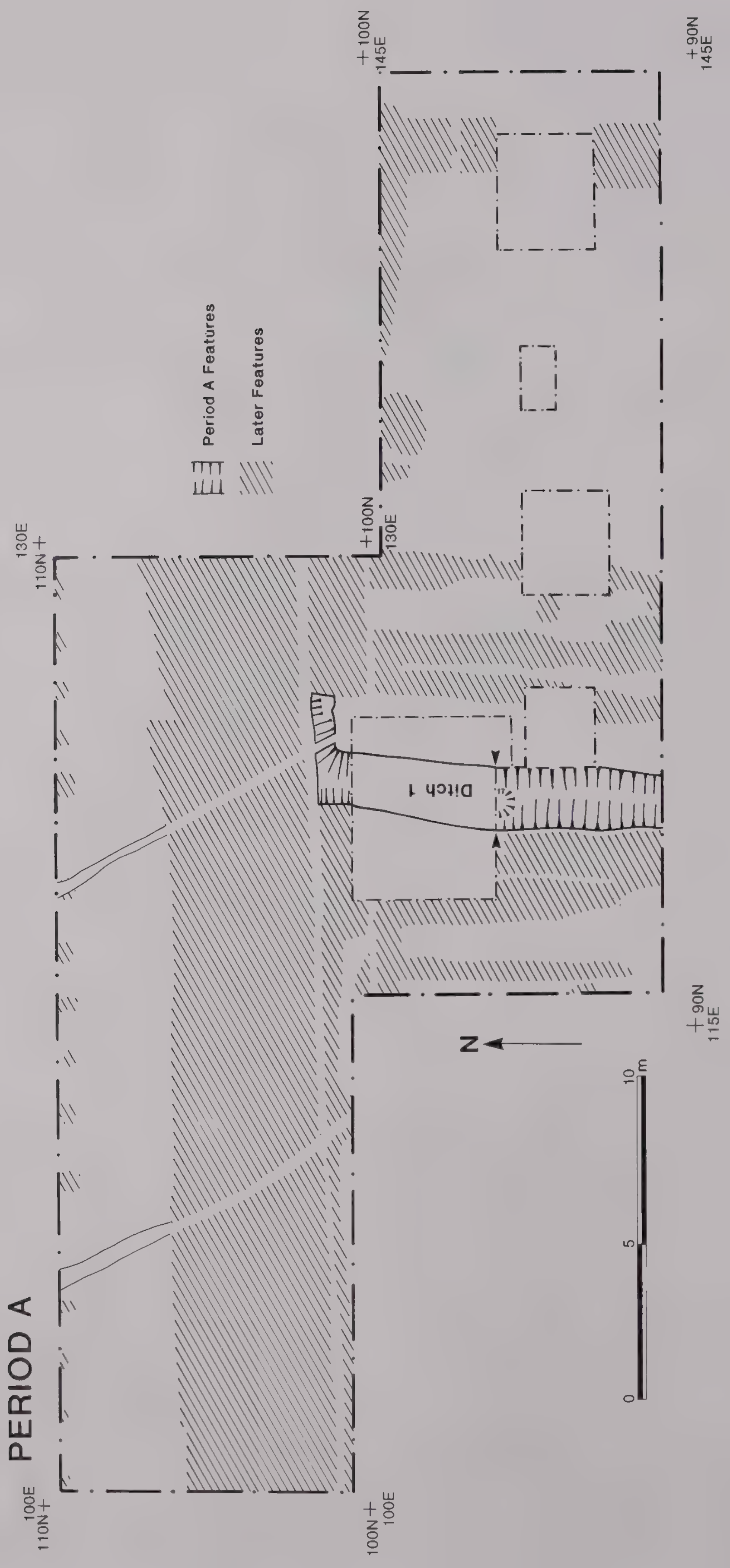
Pit 2 which cuts Ditch 4 (Illus. 5.18 and 5.28) must



Illus. 5.12 *Bursea House. Plan of Area A showing the principal excavated features and their relationship to those located by resistivity survey (low density stipple = low resistance; high density stipple = high resistance)*



Illus. 5.13 Bursea House. Principal excavated features in Area A



Illus. 5.14 Bursea House. Principal excavated features of Period A

date to the latter part of this period as it was sealed by Kiln 1 during Period D. It was a shallow feature with a rounded profile *c.* 0.8m across and *c.* 0.3m deep.

The pottery from this phase dates to the early third century or perhaps a little later.

Period D

This period is subdivided into two phases (Di and Dii) on the basis of the stratigraphic sequence in the area of the kilns (Illus. 5.19-5.23). The principal features in both phases were a series of shallow north-south ditches which drained northwards, ultimately into the major east-west ditch (Ditch 3) cut in Period C.

In phase Di there were three ditches (Illus. 5.19). The most westerly was Ditch 5 which was excavated piecemeal at the boundray between the two season's trenches. It had a shallow 'U'-shaped profile and was up to *c.* 1.5 m wide and 0.4m deep (no published section). In the middle of the area was Ditch 6 which was *c.* 1m wide and 0.3m deep with a shallow 'U'-shaped profile (Illus. 5.27). This arguably replaced Ditch 4 of Period C which was overlain by Kiln 1. At the eastern end of the trench was the south-north sector of Ditch 7 which turned westwards through a right angle to join the Ditch 3 after a distance of *c.* 16m. The south-north sector of this ditch was steep sided with a 'U'-shaped profile, *c.* 1.2m wide and *c.* 0.7m deep. It had a furnace base of Period E constucted in its top (Illus. 5.27). The east-west sector was straight sided and *c.* 0.8m wide by *c.* 0.6m deep (Illus. 5.29). A short stretch of gully to the north of Kiln 1 (Illus. 5.20) presumably also flowed into Ditch 7.

These ditches seem to define a series of small enclosures and certainly appear to have functioned partly as drainage for the hill top. Three sides of one enclosure, formed by Ditches 6 and 7, contained Kiln 1 and Pits 3 and 4 which provide our first certain evidence for the industrial use of the site (Illus. 5.20).

Kiln 1 (Illus. 5.20 and 5.21) was oriented approximately east-west with its flue to the east. It was truncated by later activity and had been infilled with unfired clay lumps. Its overall length was *c.* 2.8m with the flue *c.* 550mm wide and the firing chamber *c.* 1.3m across internally. The walls were *c.* 0.5m wide and were made of unfired bricks of clay which had been laid into a shallow trench. The inner margins had been lined with a layer of clay *c.* 50mm thick which also formed the floor. This had become fired during the life of the kiln. The interior of the firing chamber contained three damaged pedestals which stood on top of the floor. They too had been made from clay bricks. The two lateral pedestals were *c.* 800 by 200mm and survived to a height of up to 200mm. That on the axis of the kiln was placed between the ends of the other two and was slighter, *c.* 200mm by 200mm. Charcoal from the final firing was distributed over floor through the flue and to within *c.* 50mm of the two lateral pedestals. This kiln would appear to be a variant of Swan's Linwood-type (1984, 122) with a small, third central pedestal. It should also be noted that no evidence was recovered of portable bars to span between the pedestals.

Immediately to the south of Kiln 1 was Pit 3 which cut into its southern wall (Illus. 5.20). This charcoal-filled feature was only partially excavated because of the presence of a tree and could perhaps be associated with another kiln. It was shallow, *c.* 0.8m across and *c.* 0.2m deep (Illus. 5.28).

Pit 4 was *c.* 1.4m wide, *c.* 2m long and *c.* 0.4m deep with a flat bottom and rounded sides (Illus. 5.28). Its lower fill comprised sand and charcoal but this was sealed by a substantial deposit of clay blocks. This was probably derived from the demolition of Kiln 1 and there is no evidence that the pit was used for mixing clay. It should be noted that a preliminary interpretation of this feature (quoted in Evans 1985) as a third, poorly preserved kiln has now been excluded.

In phase ii (Illus. 5.22) Ditch 7 appears to have remained in use but Ditch 5 was replaced by Ditch 9 and Ditch 6 by Ditch 8. Ditch 8 had a shallow 'U'-shaped profile, *c.* 0.7m wide and *c.* 0.4m deep (Illus. 5.27). Its fill contained a large quantity of kiln fabric probably derived from Kiln 2 (below Section 5.3.5). The southern continuation of this ditch is probably to be equated with Ditch Z in trench A3 (Illus. 5.12). Ditch Z had a 'U'-shaped profile which was *c.* 1.0m wide by *c.* 0.4m deep. Ditch 9 was *c.* 0.4m wide and *c.* 0.2m deep with a very shallow 'U'-shaped profile.

These replacement ditches can be viewed as resulting from recutting on slightly different alignments as both replacements appear to have fulfilled the same functions. Contemporaneous with Ditch 8 was Kiln 2 whilst the final filling of Pit 3 (Illus. 5.23) is presumed to be have occurred when Kiln 1 was dismantled (see above).

Kiln 2 (Illus. 5.23 and 5.24) was very well preserved but slighter in construction then Kiln 1. It was constructed on an east-west alignment with the flue to the east. The overall length of the kiln was *c.* 1.65m with the oval firing chamber being *c.* 1m across. The walls were formed of unfired clay blocks set in a shallow trench. The walls were *c.* 200mm thick with an internal lining of clay up to 50mm thick which also formed the floor. This lining had become fired during the use of the kiln. The flue was slightly asymmetrical and *c.* 200mm wide with a slightly arched roof surviving. Two pedestals stood on the floor of the kiln approximately parallel with the main axis. These were incomplete but the scars on the floor of the firing chamber show that they were *c.* 0.5m long by *c.* 0.1m. They survived to a height of *c.* 55mm. This kiln is also of the Swan's Linwood-type (1984, 122). The substantial quantity of kiln fabric recovered from Ditch 8 beside the kiln is discussed further below (Section 5.3.5).

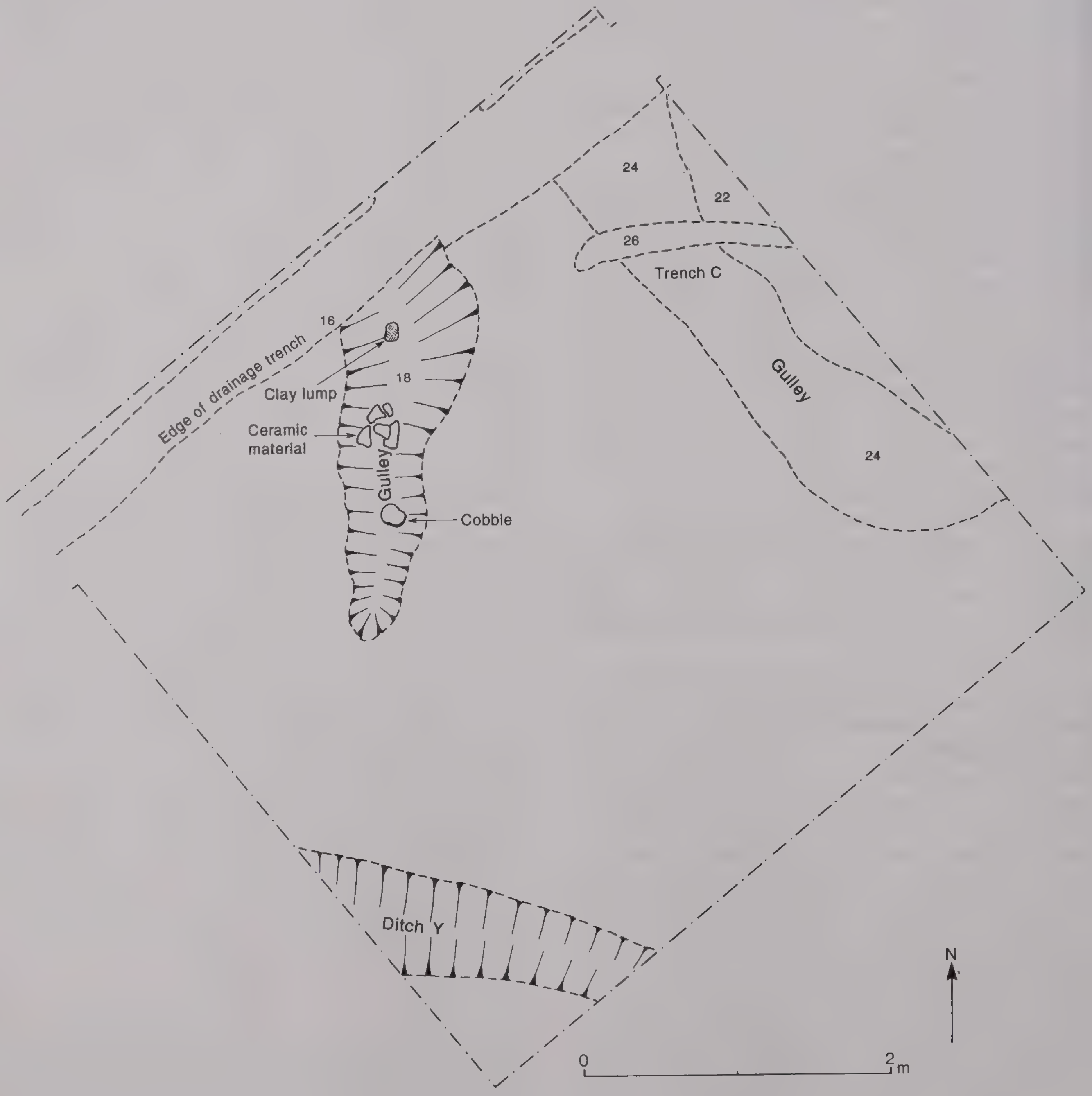
The pottery from phases Di and Dii suggests a late third- to early fourth-century date (below Section 5.6.4).

Period E

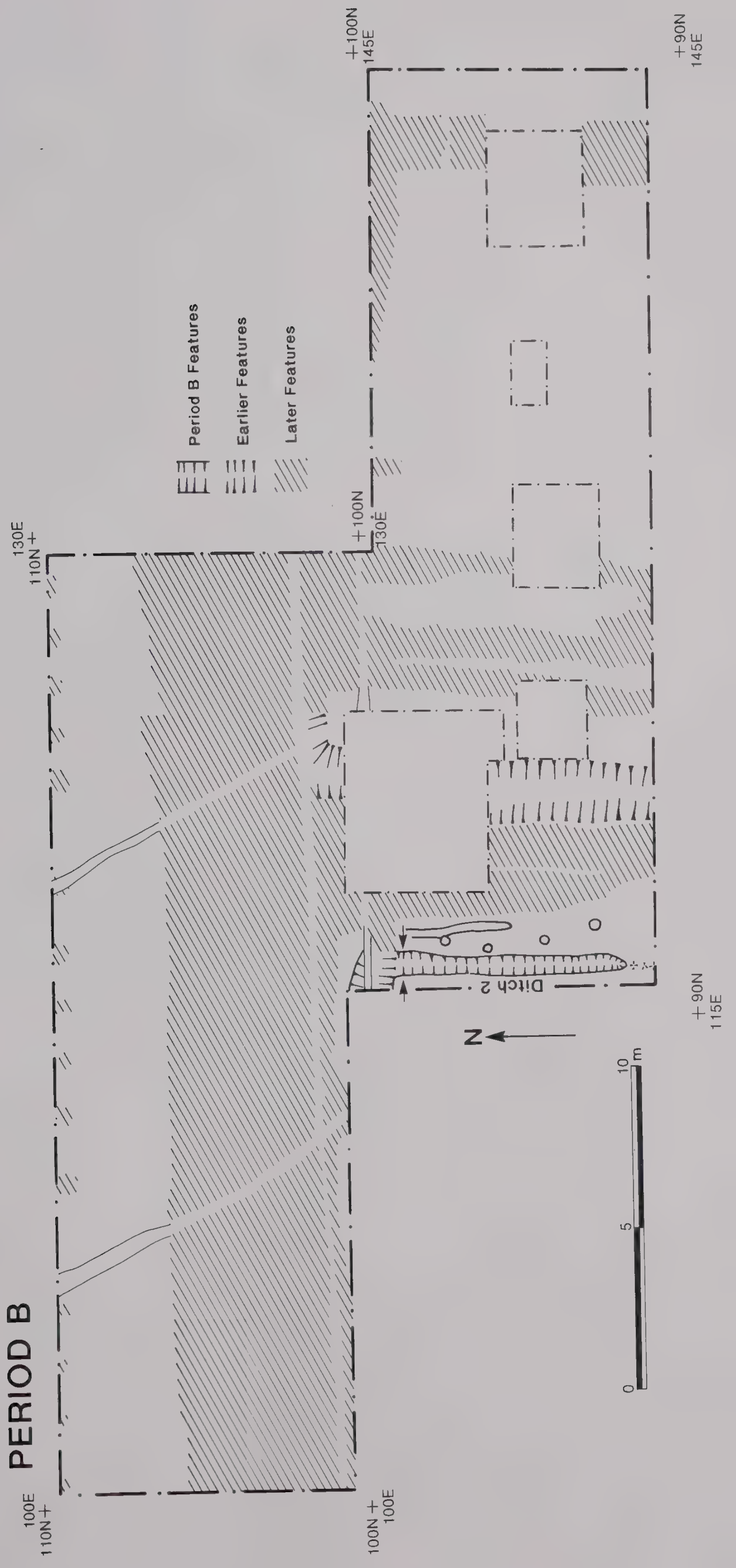
This period is subdivided into two phases (Ei and Eii) on the basis of the two recuts evident in the principal east-west ditches (Illus. 5.25). Evidence from this period came from two areas. In the northern part of the trench the principal east-west ditch was recut twice. In phase Ei Ditch 10 was recut to the south of the earlier line with a subsidiary southward extension placed where its predecessor had its junction with Ditches 6, 7 and 8. Ditch 10 (Illus. 5.29) was heavily trucnated but exhibited a shallow 'U'-shaped profile *c.* 1.4m wide and *c.* 0.5m deep. It had been recut at least once during its life. In phase Eii a further recut, Ditch 11, was made to the north of the earlier line in the eastern part of the trench. This ditch was *c.* 1.0m wide and *c.* 0.8m deep and had at least three recuts (Illus. 5.29).

In the eastern part of the site a small hearth was constructed in the hollow in the top of Ditch 7 (Illus. 5.25 and 5.27). This comprised a charcoal filled scoop *c.* 0.5m in diameter. At the time of excavation it was thought to have been a possible iron-smelting furnace. Subsequent examination of the material from it has shown it contain much charcoal but no slag. It seems most likely that the feature represented a small hearth, but one which could have produced a considerable temperature.

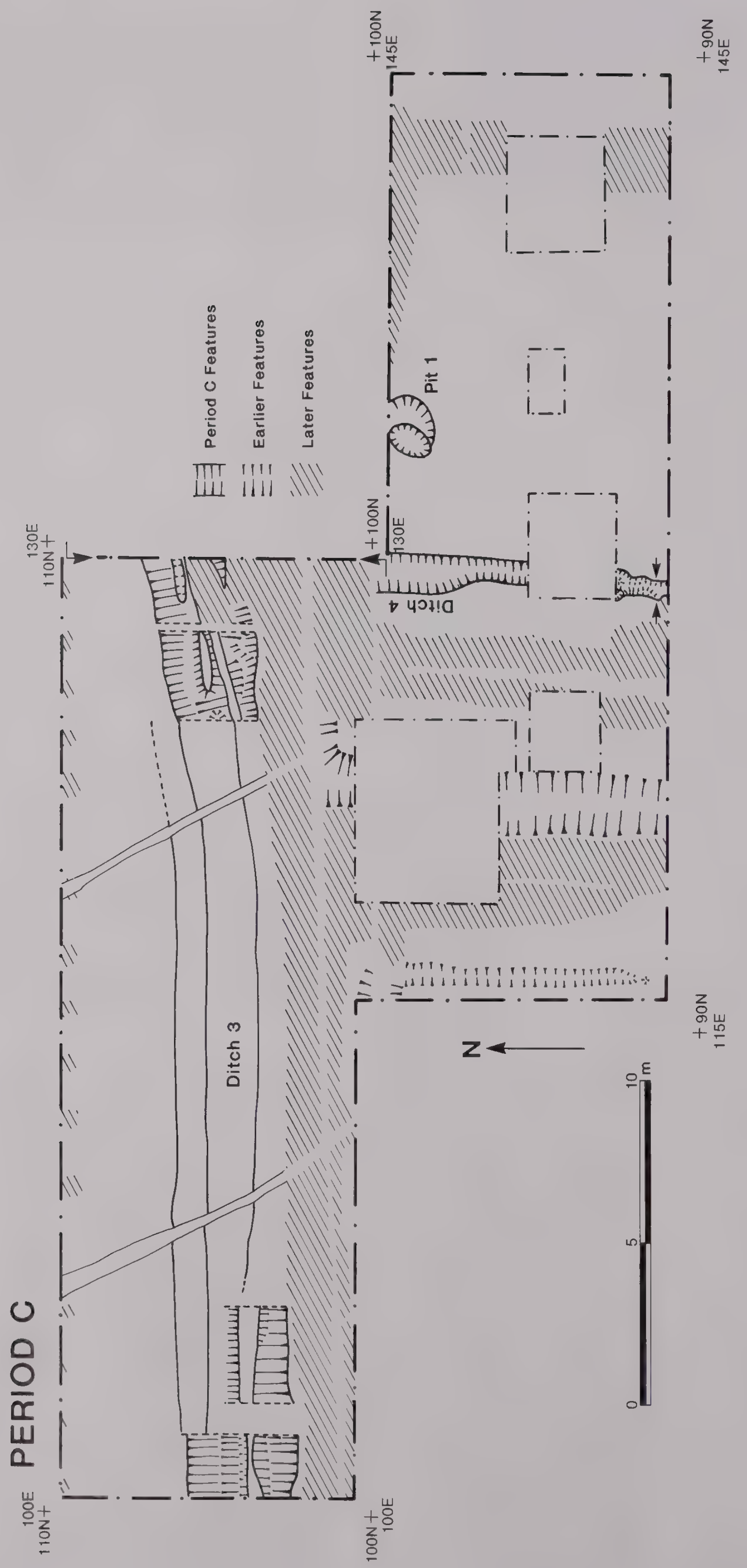
The pottery from phase Ei suggests a late third- to



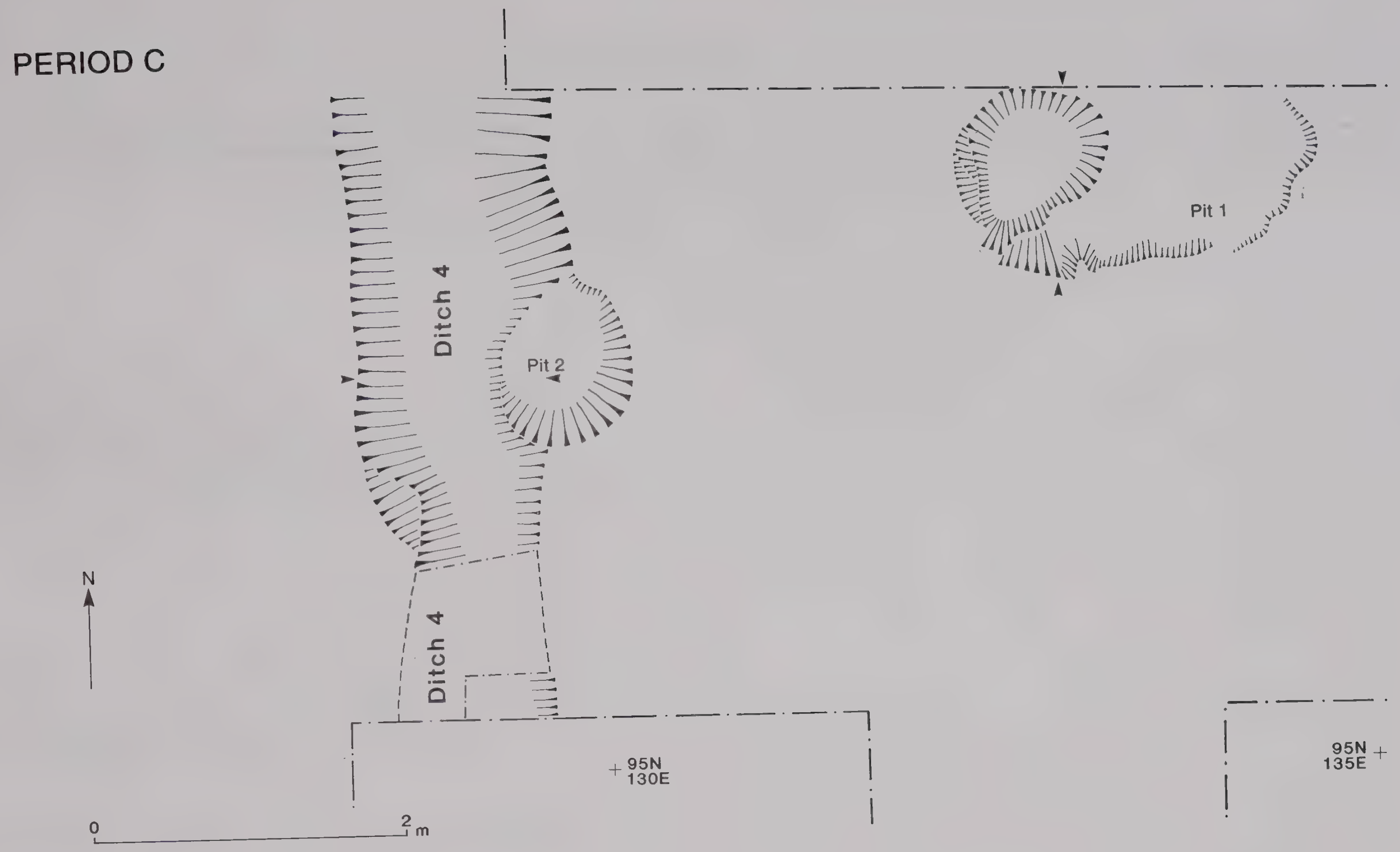
Illus. 5.15 *Bursea House. Overall plan of the features exposed in Area A1 (for location see Illus. 5.8)*



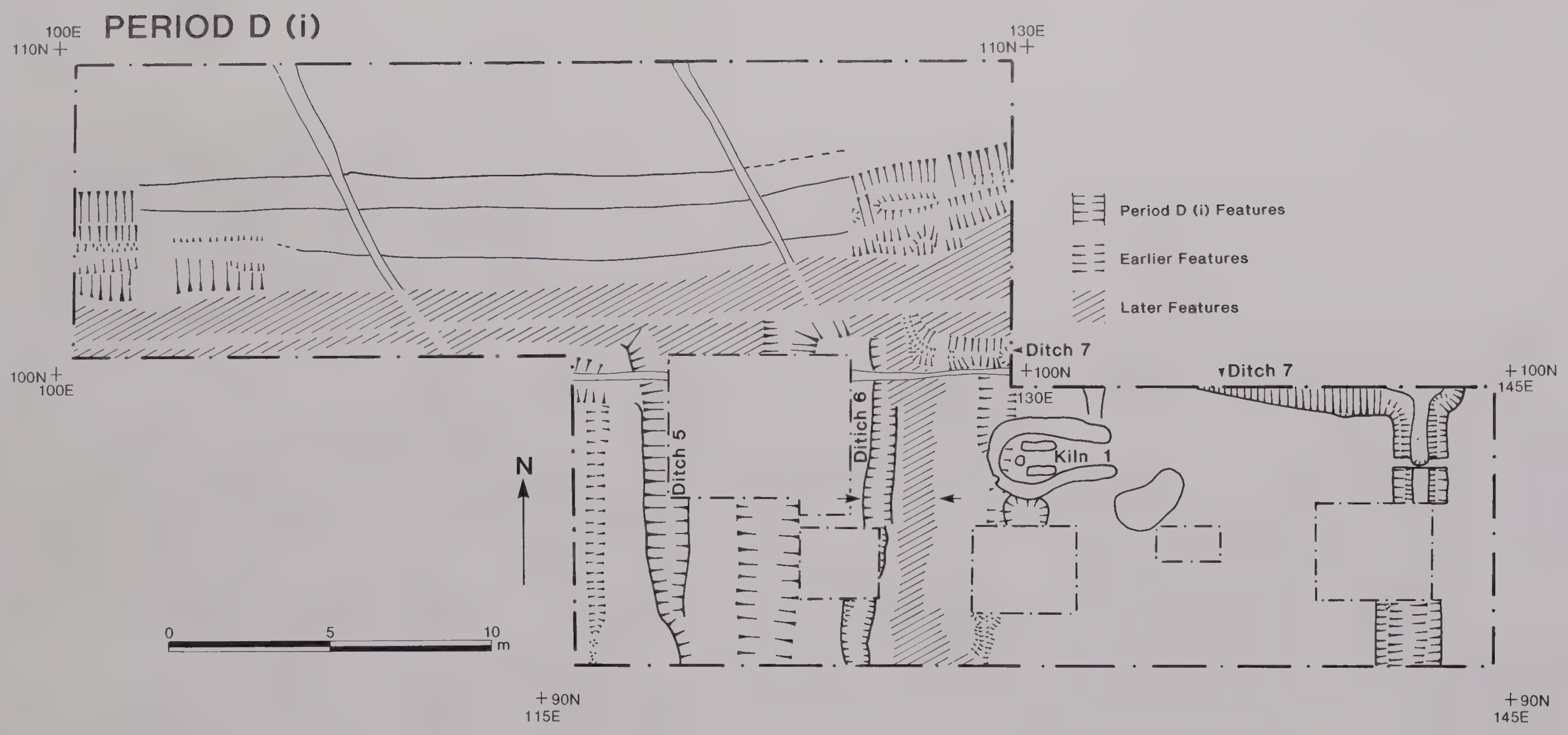
Illus. 5.16 Bursea House. Principal excavated features of Period B



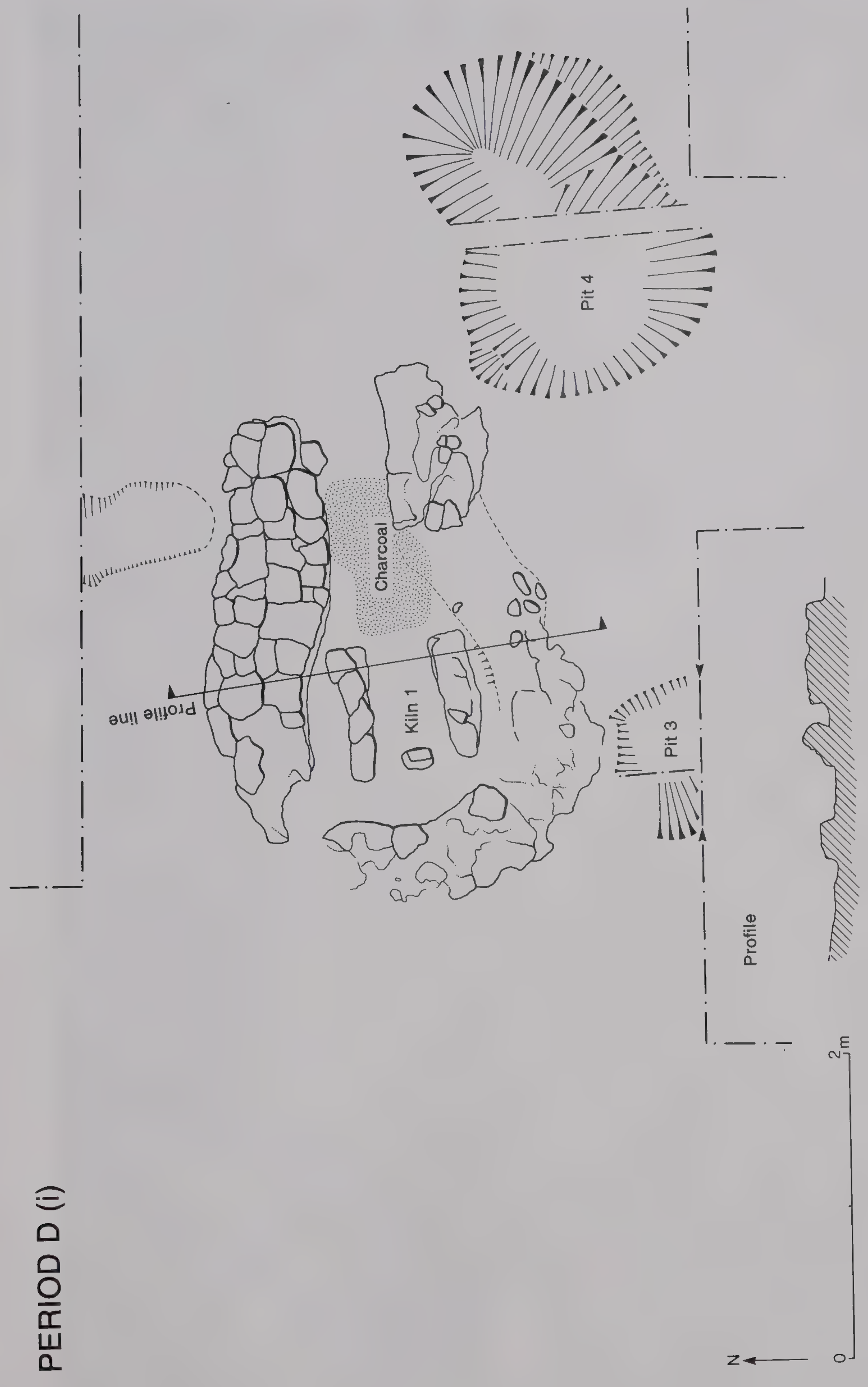
Illus. 5.17 *Bursea House. Principal excavated features of Period C*



Illus. 5.18 *Bursea House. Detailed plan of features of Period C in the area of the later kilns*

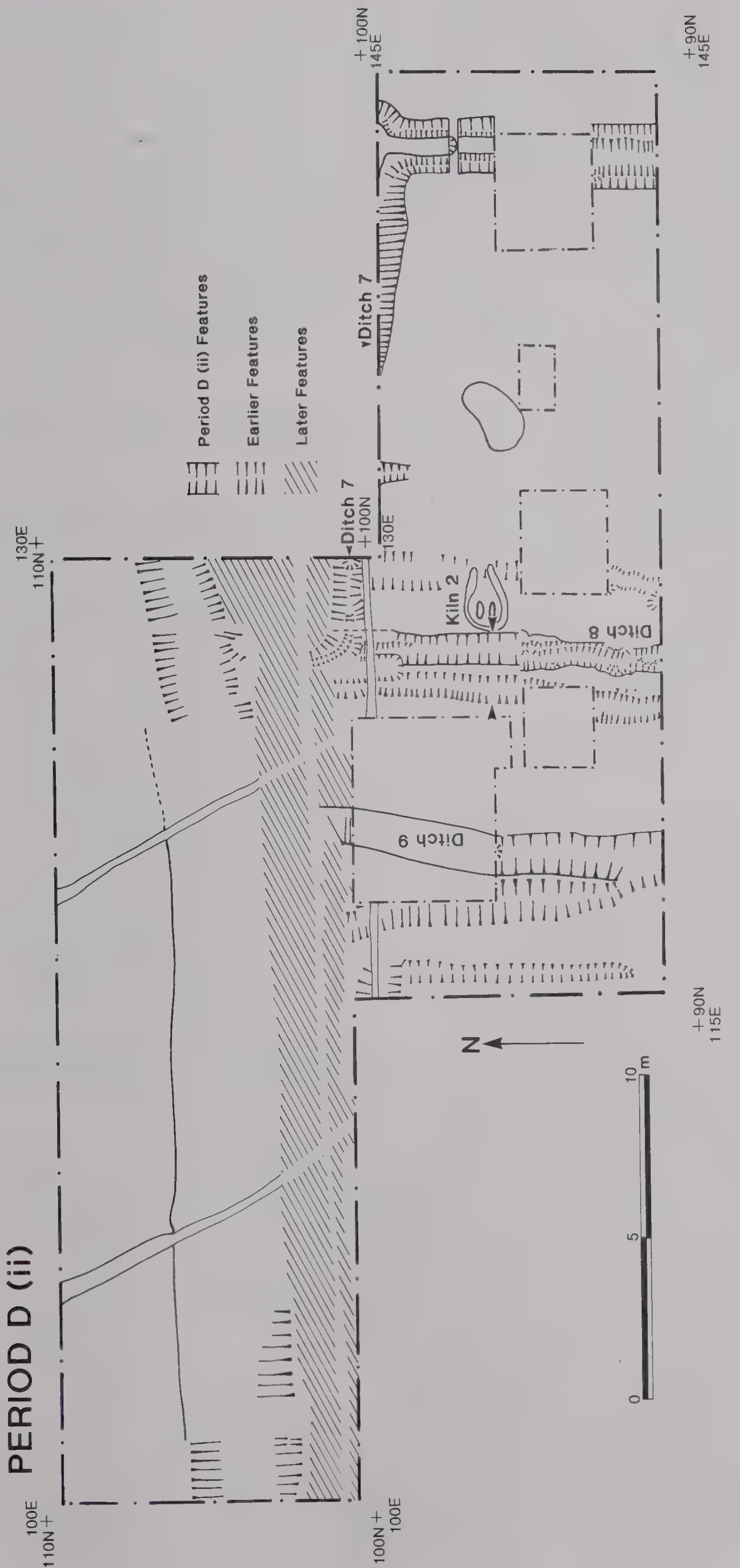


Illus. 5.19 *Bursea House. Principal excavated features of Period Di*

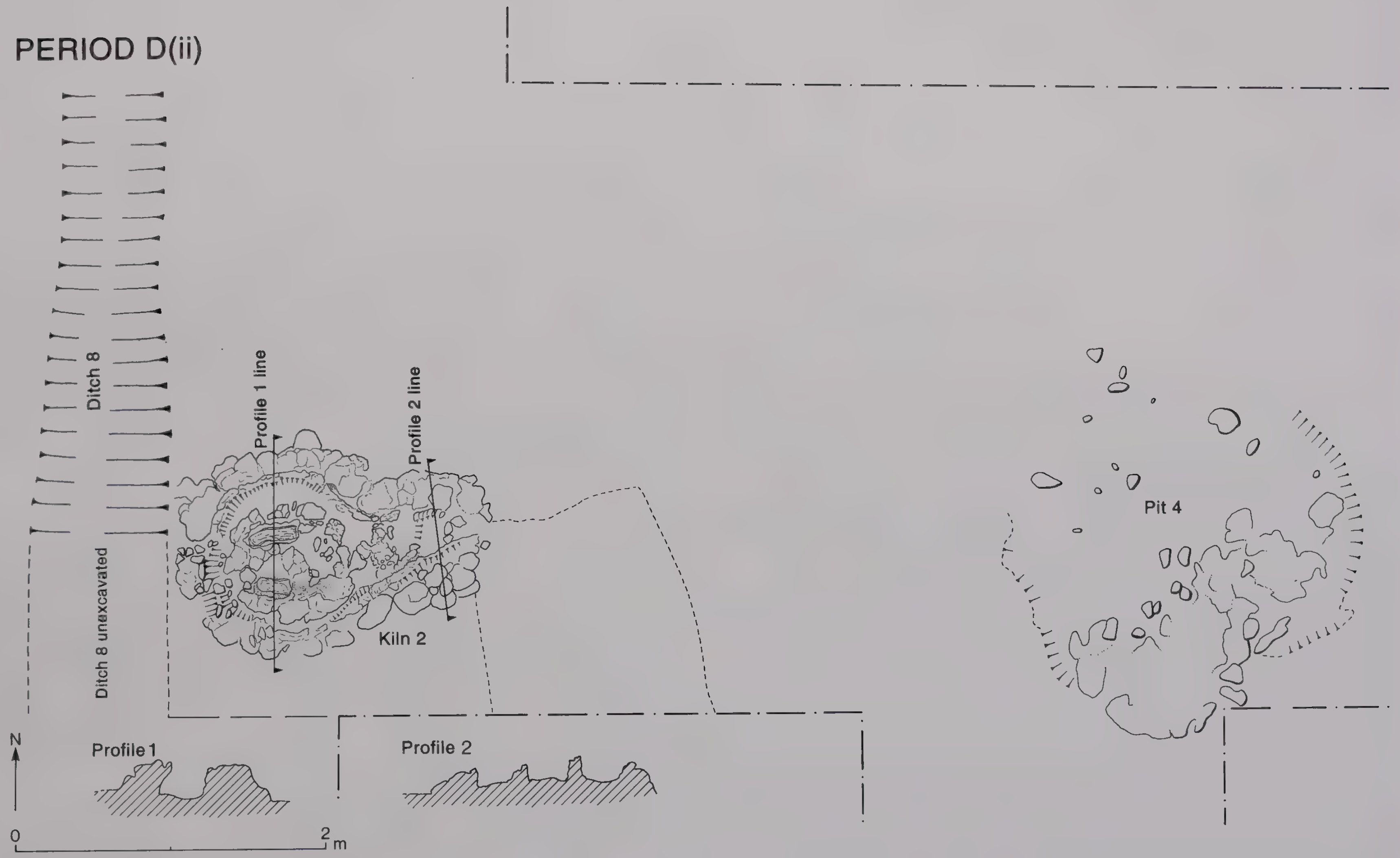


Illus. 5.20 *Bursea House. Detailed plan of features of Period Di around Kiln 1*

Illus. 5.21 Bursea House. Photograph of Kiln 1 from the west (scale 1m)



Illus. 5.22 *Bursea House. Principal excavated features of Period Dii*



Illus. 5.23 *Bursea House. Detailed plan of features of Period Dii around Kiln 2*

early fourth-century date. That from phase Eii dates to the early-mid fourth century (below Section 5.6.4).

Period F

The only evidence from this period comprises a line of post holes which run along the northernmost edge of the excavation (Illus. 5.26). Their date is uncertain, but given their size and generally close spacing (*c.* 1m) they are most likely to have formed a boundary. They may have been contemporaneous with Period E but as the line of post holes is not parallel with Ditch 11 this is perhaps unlikely. Pottery from these post holes dates to the late fourth century (below Section 5.6.4).

5.3.3 The 1987 and 1991-92 trenches

The two trenches opened in 1987 and 1991-92 can only be correlated to the main sequence in general terms. Ditch Y in trench A1 has already been discussed under Period A (above).

The stratigraphy in the trench A1 (Illus. 5.15) could be divided into two broad periods. The first phase comprised two features, Ditch Y and a gully (context 18). The fill of Ditch Y was sealed by packed cobbles and contained exclusively local hand-made pottery, which probably began to be produced in the late Iron Age but continued in use down to the second century A.D. (below Section 5.6.2). The adjacent gully (Illus. 5.15, context 18) was not stratigraphically linked with Ditch Y and their sequence cannot thus be established. It also produced local hand-made pottery, including a rim sherd in the Dragonby tradition which may date to the late first century B.C.-early first century A.D. (Illus. 5.39, no. 9.1). The gully may have formed part of a round-house but too little is known for any certain interpretation to be offered.

The second phase comprised another gully (Illus. 5.15, context 24) the pottery from which can be dated to the third-fourth centuries. When plotted in relation to the geophysical survey (Illus. 5.12), this feature appears to represent part of a ditch system, arguably related to Ditches 5 and 6 in the main excavation. Such a relationship would suggest a Period D date.

Area C excavated in 1991-92 (Illus. 5.11) is too distant from the main excavated area for any sound correlation (Illus. 5.8). The gully (11) is perhaps contemporaneous with Period A. The principal east-west ditch (2, 3, 9) produced a substantial amount of third-century pottery suggesting that it was broadly contemporaneous with Periods B-C. As such it is conceivable that it formed part of the same enclosure complex as Ditch 3.

5.3.4 Stratigraphic synthesis

The overall impression created by this site is of a complex of intercutting ditches which comprise a multiple enclosure as seen on various of the aerial photographic sites (Section 2.2.3) and also at Hasholme Hall (Chapter 5.2). The continued occupation of the site means that it has not been possible to provide a comprehensive picture of the development of the enclosures.

It is clear that ploughing and other disturbance has removed most of the stratigraphy over the bulk of the site although the remarkable preservation beneath the trees in the area around the excavated kilns shows that pockets of good preservation do survive. Elsewhere, the various interventions have demonstrated that concentrations of surface finds mostly indicate the presence of buried ditches filled with pottery. This obscures the important survival of earlier ditches which have been demonstrated to date to the later Iron Age or earlier Roman period. It is possible that intensive and more sophisticated geophysical survey might trace these ditches but our work was not very successful in achieving this.

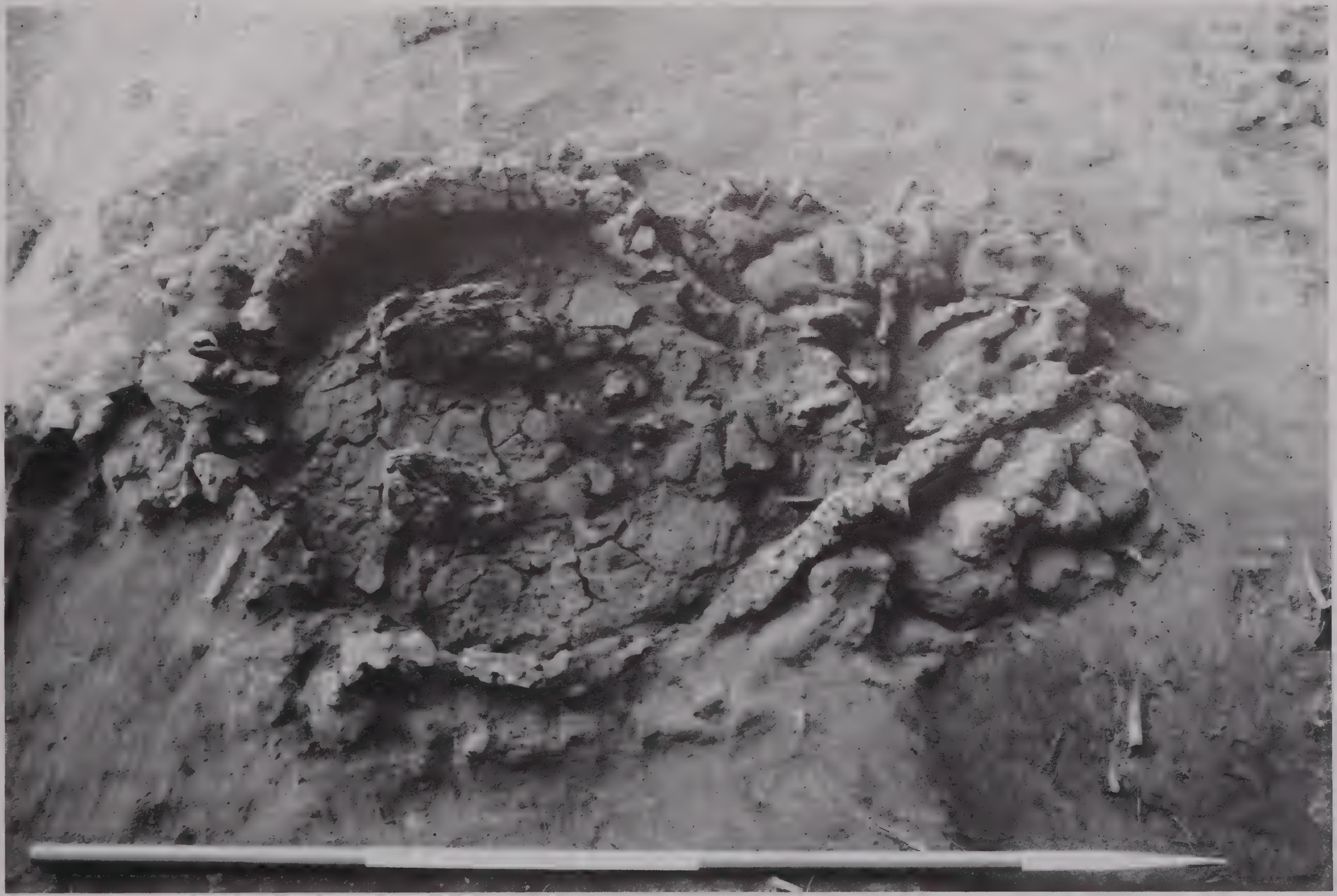
An analysis of the layout of the site shows that the excavated kilns were located towards the margins of the settlement in a similar situation to that suggested for the kilns at Hasholme (Section 5.2.2). This would imply that the core of the contemporaneous settlement probably lay on the hill top in the region of the present farmhouse. The density of pottery in the garden of the farmhouse would tend to support this hypothesis.

5.3.5 Kiln studies 1: fabric

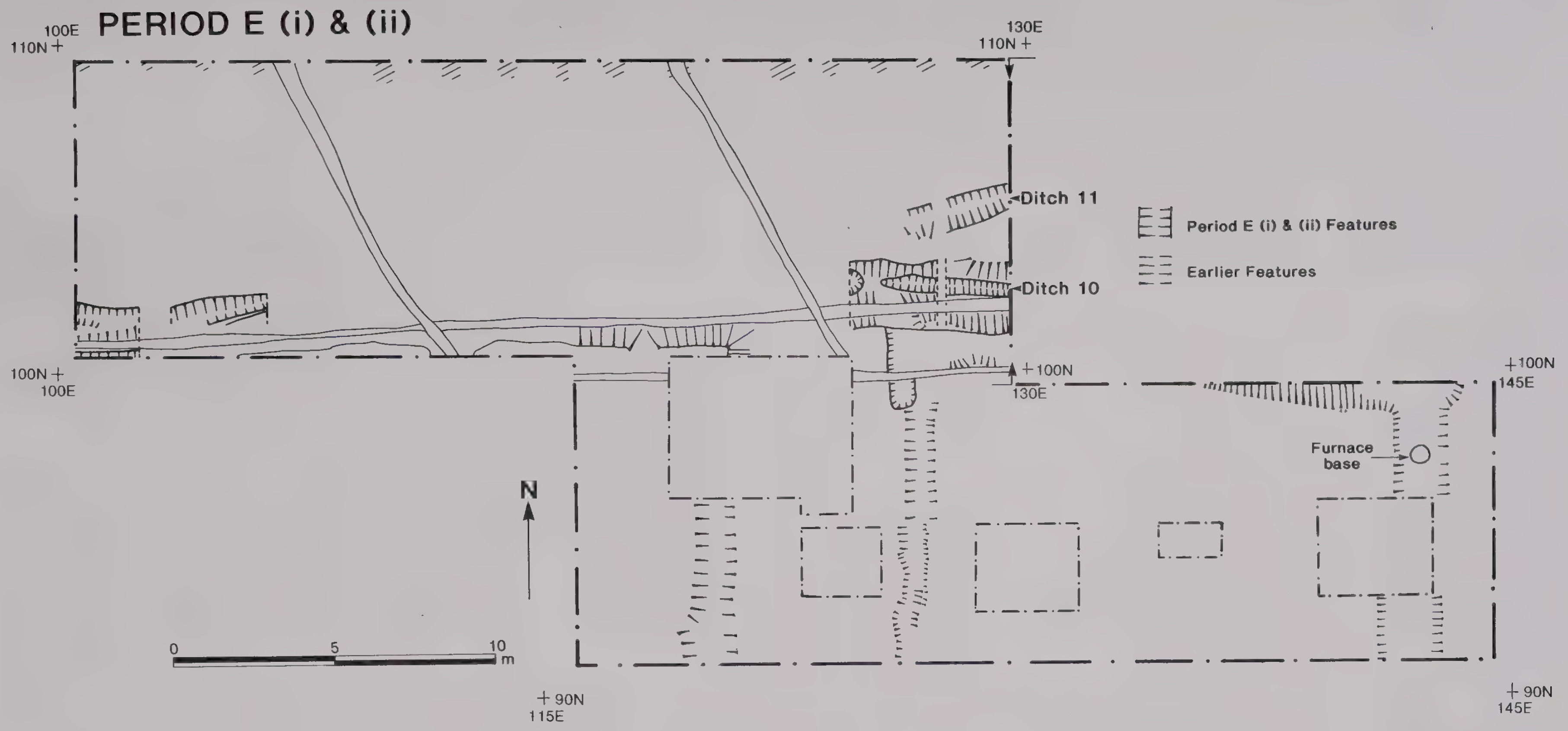
The excavation recovered a substantial quantity of kiln fabric. The majority comprised flat pieces of heavily vegetable-tempered fired clay (Illus. 5.33) and there were no kiln bars or similar items of kiln furniture. The only distinctive piece (Illus. 5.30) is a well-made disk, *c.* 160mm in diameter, with a slightly bowl shaped cross section. This seems likely to have been used as a spacer between pots in the kiln during firing (cf. Swan 1984, 64-65).

The assemblage of undiagnostic pieces was studied in detail by Martin Stempczyk (1986) whose results are summarized here. Two basic groups of fabric were distinguished on the basis of their morphology and thickness. The first group (the kiln lining) comprised the thicker pieces (30-70mm thick) which derived from the lining of the permanent walls of the kilns. This would have continued the floor and wall-lining noted in the excavation of Kilns 1 and 2. One of the pieces apparently came from the upper edge of these permanent walls. The remainder of the fragments (the kiln roofing) were thinner (10-24mm thick) and apparently formed irregular plates of clay which were used to create a temporary roof used during the firing. Some of the pieces were curved and it was demonstrated that the curvature on some was consistent with the estimated diameter of a domed roof which would have fitted the excavated kiln. The quantities of these two groups are summarized in Table 5.4 which demonstrates that the bullk of the material was associated with Kiln 2.

Stempczyk undertook a more detailed study of the large group of material found in association with Kiln 2. He modelled the theoretical shape of the kilns using simple geometrical forms and thus estimated the volume of material needed to build the structure. He calculated that a complete



Illus. 5.24 Bursea House. Photograph of Kiln 2 from the south (scale 2m)



Illus. 5.25 *Bursea House. Principal excavated features of Period Ei and Eii*

kiln would have required *c*. 62kg of lining and *c*. 53kg of roofing. On this basis the material recovered (Table 5.4) represents approximately one whole kiln lining and two temporary kiln roofs, showing that it had been fired on at least two occasions. Given the good preservation of the deposits in the vicinity of Kiln 2 it is likely that the excavated material represents almost the complete by-product of its firings.

5.3.6 Kiln studies 2: fuel

During the 1983 season it was noted that much of the charcoal found comprised recognizable roundwood fragments which suggested the use of coppiced woodland for fuel. It was thus decided to collect the visible fragments by hand during excavation. Each piece was wrapped individually in foil in an attempt to prevent fragmentation. This material was passed to Caroline Cartwright for identification.

Charcoal identifications

by Caroline Cartwright

Samples from 30 contexts were submitted for analysis. These samples comprise 0.857kg of identifiable charcoal in fragmentary form. Details of identifications according to phase and context are shown in Table 5.5. Comparisons are expressed as a percentage by weight.

It may be inevitable that the study of charcoal from hearth or kiln contexts poses more questions than it answers. It is necessary to examine the degree to which such material is truly representative of a strategy of specific fuel selection, and indeed of the environmental resource base as a whole. There are two areas of difficulty. First, how far the qualitative and quantitative characteristics of the excavated material are representative given the the consumption of the greater part of the fuel during firing. Second, whether what remains is the result of deliberate timber selection or of the environment on and around the site.

Particular preferences are exhibited in this material, analysed as a whole assemblage (Table 5.5) and according to phase (Table 5.6). Taken as a whole assemblage, the figures indicate a peak presence of alder (45 per cent), willow follows (31 per cent), with birch at 16 per cent and oak (6 per cent). Hazel and pine represent only 1 per cent each.

It is tempting to account from the high presence of alder and willow as a result of their specific selection for their particular characteristics in the firing environment, as the hypothesis of deliberate timber selection for kiln fuel seems feasible. However alder and willow may also be the most highly represented because the trees are the most common in a wet, marshy environment. Equally they may have been the easiest or most handy to collect when fuel sources were located.

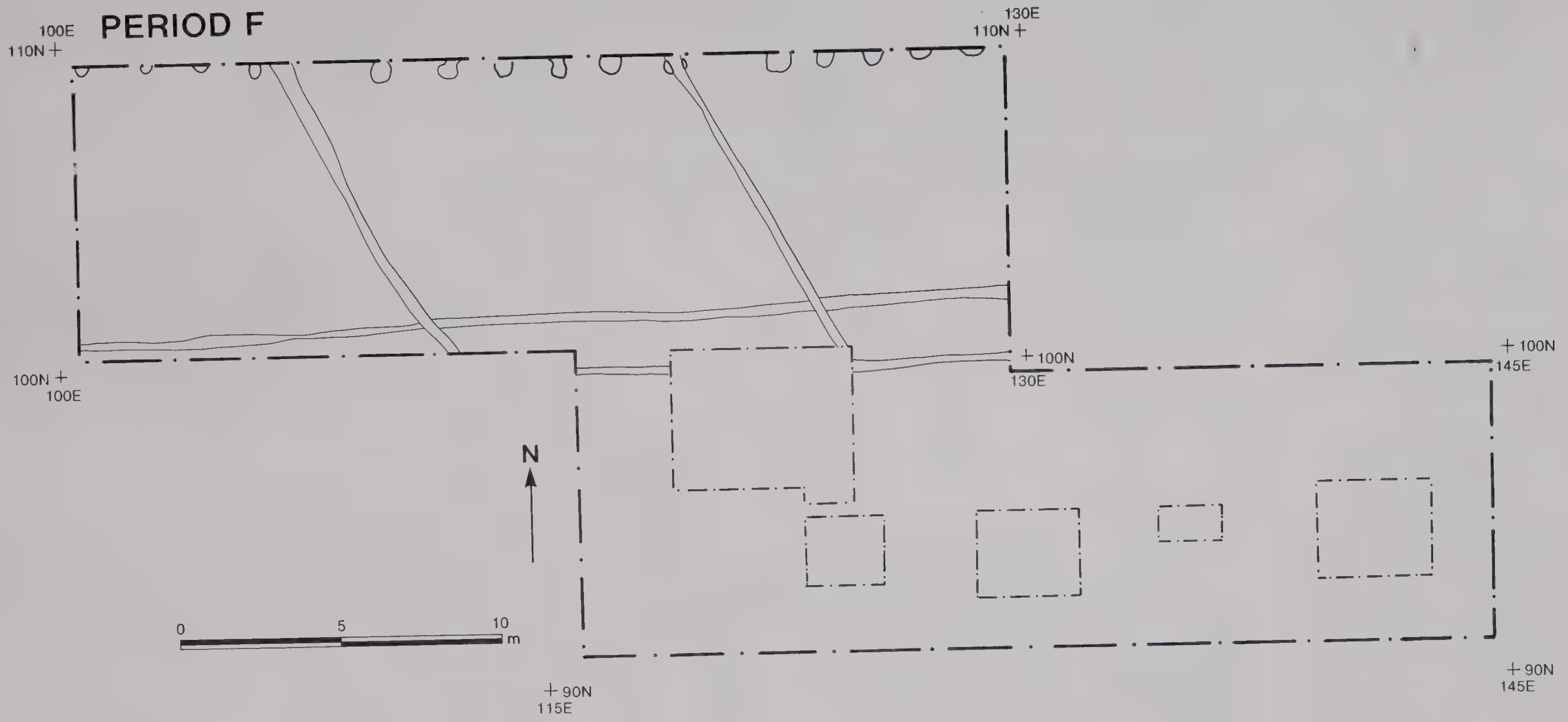
We may account for the relative percentages of trees present as indicative of the local ecology (i.e. wet, marshy or near a river - alder and willow; open (colonized?) areas or woodland fringes (birch); oak forest with underbush, possibly on acidic soils (oak, hazel, pine). However the charcoal fragments may have derived from a range of sources and locations through a variety of mechanisms. The pollen diagram from the Hasholme logboat (Turner 1987) does confirm the presence of substantial woodland beside the Foulness until the middle Iron Age. There, the pollen was dominated by alder and oak with lesser proportions of hazel and birch. It seems likely that such woodland was still common in the area into the Roman period (below Chapter 8.1).

It remains a research priority to establish, perhaps through experimental replication, exactly what remnants one is analysing when examining the charcoal still present in, for example, a stokehole. The percentage of timber (or indeed specially prepared charcoal) inserted as fuel which is entirely consumed or converted to ashy material, is crucial to any interpretation. It may be suggested (as in this assemblage) that the bulk of fuel derived from roundwood (twigs and branches). However, there is some evidence to suggest (through observation in experimental firings) that roundwood charcoal fragments will survive in that form only at the fringes of a stokehole area. The greater bulk of material, be it roundwood or larger (heartwood) timbers, may have been entirely destroyed in the fire. Attention thus centres on the question of whether our material indicates the deliberate selection of twigs or branches for fuel or results from its differential survival. Some trees or shrubs are consumed more readily than others, but the kiln temperatures attained (or perhaps more importantly sustained), the presence of oxygen, the kiln construction and material will all have been factors in determining the nature and quantity of the material remains.

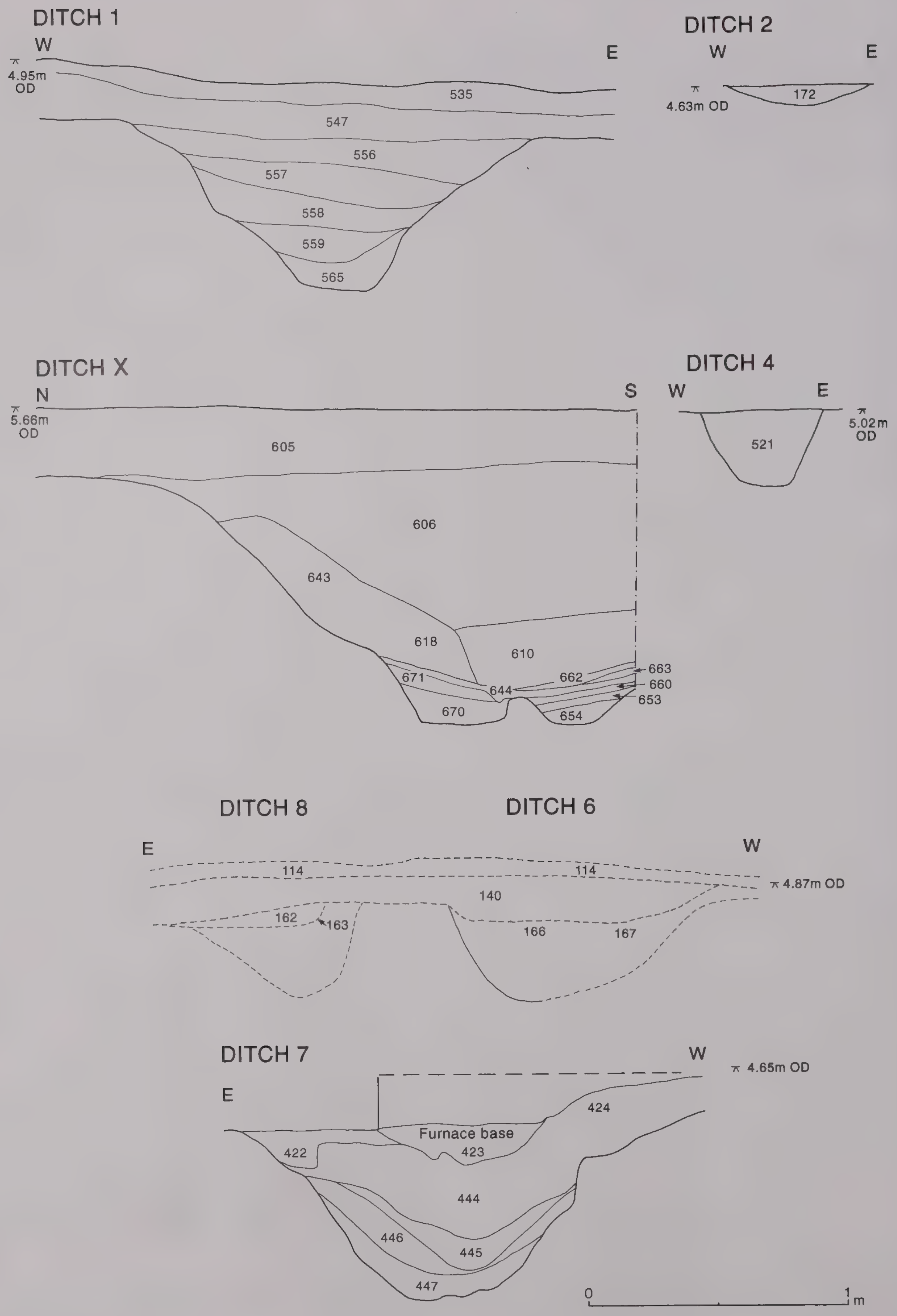
Kilns have their own individual fuel requirements depending on their design and functioning. The areas of uncertainty are the thermal capacity of the timber or charcoal when functioning as a fuel and the extent to which the timber had been converted to charcoal before its use as a fuel. When considering the timber utilized here we may, however, evaluate some key species characteristics as these will have differed in the kiln as a result of variations in anatomical structure. Birch wood is useful where a fast-burning fuel is required whilst oak provides a steady, reliable and strong burn. If brushwood, scrub, small branches, twigs and leaves are selected (alder, willow, hazel etc.) they not only serve to supplement the fuel bulk, but assist in fast ignition. If the bulk of the fuel was selected from heartwood, or mature timber, the amount will not be quantifiable from the residues. It is however probable that alder, willow and birch were the key resource timbers. Mature alder and willow timbers are slow to dry, kindle and burn - factors perhaps crucial at stages during kiln-firing.

5.4 Miscellaneous finds

The Bursea House excavation produced very little in the way of finds apart from pottery (Chapter 5.6). Poor artefact preservation results from the highly acid soil and the only iron objects derived from unstratified contexts and were modern in date. Evidence pertinent to the question of glass manufacture is presented in Chapter 6.



Illus. 5.26 *Bursea House. Principal excavated features of Period F*

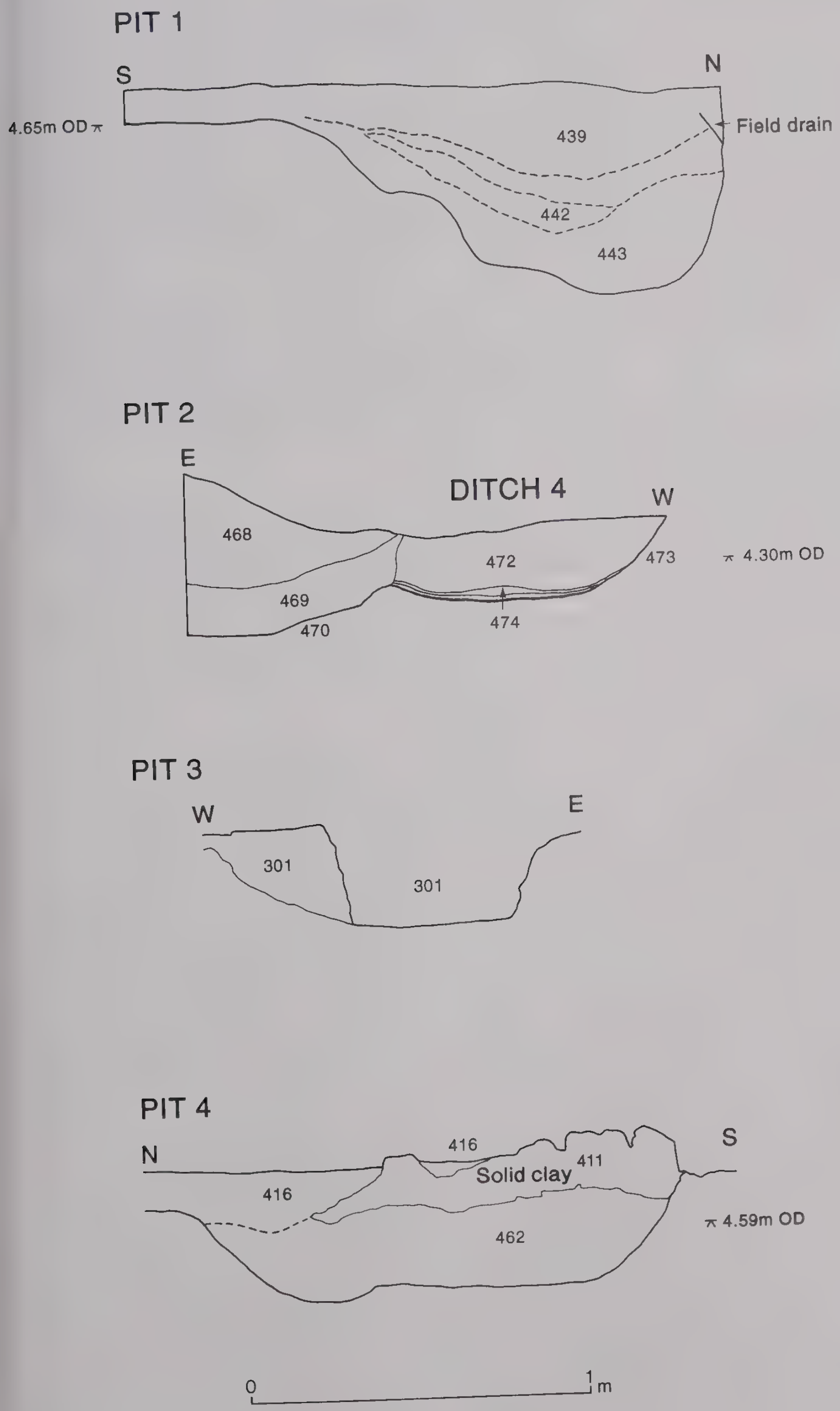


Illus. 5.27 Bursea House. Sections of Ditches 1, 2, 4, 6, 7, 8 and X. For locations see Period plans

5.4.1 The slag

(identifications by Philip Clogg)

Relatively small quantities of iron slag were recovered from the excavation (Table 5.7). This material demonstrates the presence of iron smelting and smithing on the site. The only excavated furnace (Period E above) did not produce any evidence for use in iron-working and its function remains uncertain. The largest amount of slag came from Period D, dating to the late third-early fourth century. Although we cannot be sure that this material is not residual, it seems likely that iron-working continued into the later Roman period. It may be no coincidence that Period D was also when pottery was produced on this site (Chapter 8.1).



Illus. 5.28 Bursea House. Sections of Pits 1-4. For locations see Period plans

5.4.2 The animal bone

(identifications by Sue Stallibrass)

Apart from the remains of four modern animal burials only calcined bones and tooth enamel survived in a recognizable state. The identified fragments are listed in Table 5.8.

5.4.3 The glass bangle fragments

by Jennifer Price

Catalogue entries

1. Context 157. Small Find no. 12. From Ditch 5, Phase Di

Fragment, D-sectioned bangle, 25 per cent of circumference surviving. Blue-green ground; at centre of outside surface, one horizontal dark blue and opaque white unmarvered cord, tightly twisted clockwise (S-twist). Uneven in thickness. Very bubbly. Inside surface pock-marked.

Height 8-10mm; thickness 7–8mm; internal diameter 44mm; length 38mm.
(Previously published - Price 1988, 359 and fig. 19.2 no. 10.)

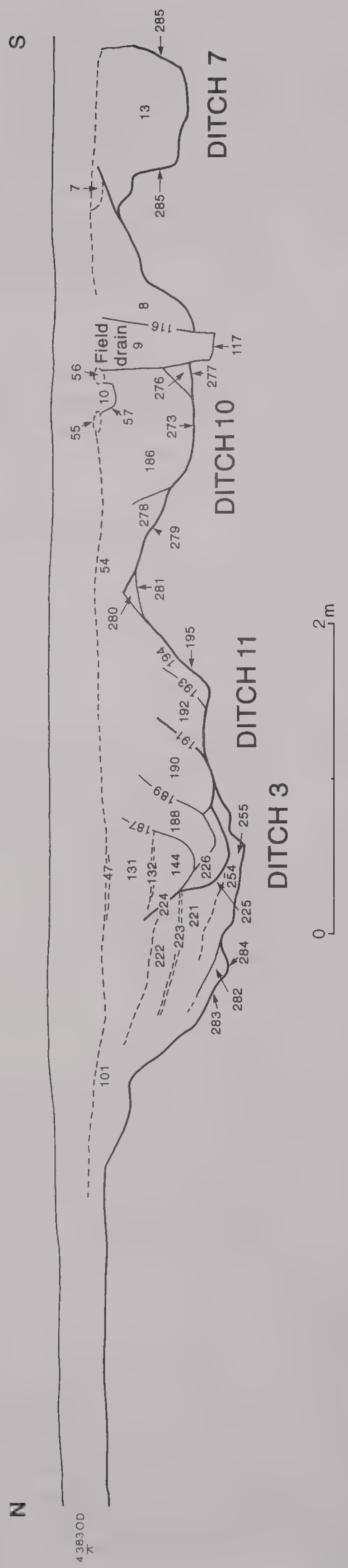
2. Context 54. Small Find no. 9. From Ditch 10, Phase Eiii

Fragment, D-sectioned bangle, 10 per cent of circumference surviving. Blue-green ground, four very narrow horizontal dark blue and opaque white marvered cords, very loosely twisted clockwise (S-twist).

Height 10mm; thickness 6.2mm; internal diameter *c.* 46mm; length 17.5mm.
(Previously published - Price 1988, 362 and fig. 19.3 no. 46.)

Discussion

Fragments of two Romano-British glass bangles were found during the excavations at Bursea House. Both come from seamless bangles with plano-convex, or D-shaped, cross-sections and small internal diameters. The ground colour of both is blue-



Illus. 5.29 Bursea House. Principal section across Ditches 3, 7, 10 and 11. For location see Period plans

green, and both are decorated with dark blue and opaque white twisted cords. No. 1 undoubtedly belongs to the group of plano-convex glass bangles with translucent ground colours and one or more horizontal unmarvered twisted cords which were classified as type 2 bangles in a survey of glass bangles in Britain undertaken by Kilbride-Jones (1938a). No. 2 is a less common variant, but it is closely related to the same type of bangle.

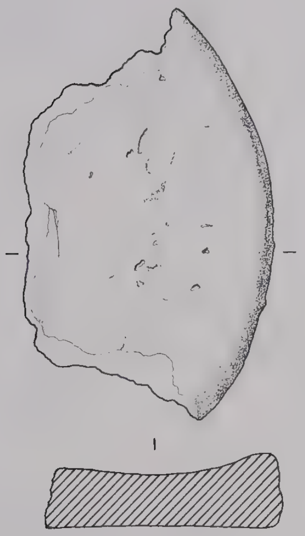
Since the initial survey by Kilbride-Jones, type 2 bangles have been studied on several occasions, by Stevenson (1956; 1976), van Lith (1977), Price (1988; 1995) and others. Fragments are widely distributed in Britain. Some are known in southern England and Wales, and a very large number have been found in the northern frontier region of the Roman province, at sites between the Humber and southern Scotland. Only two have been noted outside Britain, in the auxiliary fort at Valkenburg and at Dorestad, in the Netherlands (van Lith 1977; 1979, 20).

Type 2 bangles were in production in the later first century. The earliest dated examples occur in the third quarter of the first century at Roman sites in southern Britain which often have a late Claudian or Neronian military phase (Price 1995). The Valkenburg fragment, which was found in a context dating from A.D. 47-69, also belongs to this early group (van Lith 1977).

In northern England and southern Scotland, the earliest bangles are known in Flavian contexts, and many also occur in early second century or later contexts. The type 2 bangles in northern Britain occur at a wide range of settlements. They are found quite regularly in association with military sites, and it is probable that they were produced locally from recycled vessel glass, perhaps in the satellite settlements attached to forts.

Type 2 bangles are fairly common finds in East Yorkshire; a recent survey recorded forty-four pieces from twenty-two sites (Price 1988), and several others are known. Within the type, individual pieces vary considerably in decoration and size. Some, like the Bursea House piece, have a single central cord twisted clockwise or anticlockwise, while others also have applied spiral blobs, or several cords and trails on the centre, sides and edges of the bangles. Within the group of bangles decorated with a single central cord (with or without applied blobs) a wide range of sizes is recognizable. Some, like the Bursea House bangle, have small internal diameters (32-45mm) and slight profiles, while others have internal diameters of 60-70mm and more robust profiles.

The variation in size raises questions about the use of these objects, and whether they all served the same purpose. Their name implies that they were personal ornaments, worn on the arm or the ankle, but most type 2 bangles have been found as fragments, apart from two from burials in York found in nineteenth-century excavations, and no information about their deposition has survived. The pieces found in southern Britain in the third quarter of the first century are larger than those found in northern Britain, having internal diameters of 70-90mm. These could easily have been worn as bracelets by adult males. The group of large bangles from



Illus. 5.30 *Bursea House. Fragment of kiln furniture from Phase Di. Scale 1:2*

Table 5.4

Bursea House. Quantities of kiln fabric (kg)

Phase	Kiln lining	Kiln roofing
Period C Pre Kiln 1	2.555	4.350
Period Di Kiln 1	0.895	1.795
Period Dii Kiln 2	58.980	111.210

East Yorkshire mentioned above might also have been large enough worn by males, but this does not apply to the Bursea House piece and the other small examples. If they were personal ornaments they must have been produced for females or children.

It is, however, far from certain that these objects were worn or the wrist or ankle, or by humans. They may have been used for other decorative purposes, such as fasteners (Allason-Jones and Miket 1984, 282), hair-rings or horse-trappings (Stevenson 1976, 50 and 53). They may indeed have had a quite different function as 'money-like things', as was suggested for the late La Tène bangle fragments found in the lower Rhineland before the Roman monetary economy was established in the region (Willems 1983, 110-12). This proposal may be less apposite for the Romano-British glass bangles, as they appear after the province was established and are frequently associated with Roman military sites as well as other contemporary settlements.

The second bangle fragment (no. 2) has close links with type 2 bangles, but its decoration, very narrow, very loosely twisted, horizontal cords marvered flush with the outside surface, has seldom been noted, apart from two other pieces at sites in east Yorkshire. One, from Stony Rigg, Ingleby Greenhow, North Yorkshire, has seven similar cords, two yellow-brown and white and five dark blue and white (Hayes 1968; Price 1988, 362, no. 45a), and the second, from South Cave, East Yorkshire, has nine dark blue and white cords (Price 1988, 362, no. 48).

5.5 The charred botanical remains

by Carol Palmer [1]

5.5.1 Background and aims

The carbonized remains collected from Bursea House represent an unusual archaeobotanical assemblage because they are derived from an industrial complex (a Roman-British pottery kiln site). When the remains were submitted for analysis three specific questions were posed by the excavator. First, were crops grown in the immediate vicinity of the site? Secondly, was there any evidence for the collection of specific materials, such as fuel, for use in the industrial process? Finally, was there any evidence which would suggest seasonal use of the kilns?

Footnote:

1. This text was originally written in 1988 and was revised in March 1997.

5.5.2 Methods - sampling, recovery and identification

During the excavations a random sampling strategy was employed. Sampled contexts were chosen prior to excavation using tables of random numbers. All potential contexts had an equal chance of being selected. Almost 10 percent of the contexts were sampled, a total of thirty-seven samples.

Twenty litre samples of deposit were collected from each selected context. The sediment was processed on site by a variety of the student volunteers using the bucket flotation method. A fraction of the sample was mixed with water, and the water containing the floating fraction (the flot) was then poured through a 500µm mesh leaving the heavy fraction in the bottom of the bucket. This process was repeated until no more carbonized material could be seen floating on the surface of the water. The rest of the sample was then treated in the same way.

In the laboratory, the flots were rinsed through a stack of sieves (1.5mm, 1mm and 500µm) and air dried in preparation for sorting. Each flot was sorted using a low power Olympus microscope. In the initial scanning x20 magnification was used, but for identification and measurement of particular items, magnifications of up to x100 were employed. All carbonized plant remains, other than

Table 5.5

Bursea House. Charcoal identifications (by percent weight)

Context number	Phase	Feature Type	Sample size (g)	*Salix* sp. (willow)	*Alnus* sp. (alder)	*Betula* sp. (birch)	*Quercus* sp. (oak)	*Corylus* sp. (hazel)	*Pinus* sp. (pine)	Comments
Unstratified	u/s		12	53	26	21				Small roundwood averaging 17–20 mm.
500	u/s		5				100			Two conjoining fragments of roundwood.
504	u/s		6	100						Small roundwood fragments.
515	u/s		7		100					Roundwood fragments.
556	A	Ditch fill	4		97		3			
559	A	Ditch fill	4		100					
438	B	Post hole	6			100				
459	B	Post hole	52	51	47				2	A variety of roundwood fragments. *Salix* average 22mm stem diameter. *Alnus* stem diameters vary from 5 to 31 mm.
469	C	Pit fill	78		81	12	7			Roundwood fragments, stem diameters vary from 11 to 22 mm.
411	C	Pit fill	31.5	36	35	29				Roundwood fragments, stem diameters vary from 16 to 25 mm.
439	C	Layer	17			79	18		3	Roundwood fragments, stem diameters vary from 11 to 18 mm. *Pinus* diameters could not be measured.
442	C	Pit fill	2		100					
443	C	Pit fill	16	53		47				Small roundwood fragments.
462	C	Pit fill	195	43	39	11	2	2	3	A variety of roundwood fragments. *Salix* and *Alnus* stem diameters, 17 to 20 mm. *Betula* seldom more than 18 mm. *Quercus* stem diameters up to 105 mm. *Pinus* and *Corylus* diameters could not be measured.
90	Dii	Kiln 2	5		100					
340	Di	Kiln 1 stokehole	87.5	31	29	28	9			Roundwood fragments of average dimater 23 mm. *Quercus* comes from heartwood. There is also 3 percent unidentified root, possibly *Quercus*.
410	Di	Kiln 1 stokehole	22		7	74	19			Roundwood, diameters vary from 15 to 31 mm.
416	Di	Kiln 1	198	12	62	13	11	2		Roundwood fragments, commonly 25 mm in diameter. Finer material stem diameters vary from 7 to 14 mm.
419	Di	Ditch fill	8	49	51					Small roundwood fragments.
425	Di	Pit fill	5		100					
432	Di	Layer	27	69	15					16 percent root (perhaps *Salix*). Mainly *Salix* roundwood, diameters c. 22 mm.
435	Di	Kiln 1 collapse	7	100						
458	Di	Layer	3		100					
461	Di	Kiln	9	100						
528	Dii	Layer	25	100						Roundwood fragments.
546	Di	Layer	6		100					Roundwood fragments.
550	Di	Ditch fill	3		100					
553	Di	Ditch fill	5		100					
656	Di/ii	Ditch fill	5	100						Small roundwood fragments.
403	E	Layer	6	2	98					
Total			857	31	45	16	6	1	1	

Table 5.6

Bursea House. Summary of charcoal by phase (by percent weight)

Phase	Total weight (g)	Species:	willow	alder	birch	oak	hazel	pine
A	8		-	98.5	-	1.5	-	-
B	136		19.5	64.4	11.3	4.0	-	0.8
C	261		39.5	34.1	19.7	2.7	1.5	2.4
D	410		28.2	44.3	16.4	8.3	0.9	-
E	6		2	98	-	-	-	-

fragments of charred wood, were picked out and identified by comparison with the modern reference collection held by the University of Durham. Cereal identifications were made using the collection belonging to Martin Jones. Nomenclature for the wild taxa follows Clapham *et al*. (1962). The general term 'seed' is used throughout, without consideration of the botanical terminology (Van der Veen 1992, 22).

5.5.3 Results - the species represented

The results of the laboratory examination are shown in Table 5.9. Thirty-two samples out of the total 37 produced identifiable remains.

Cereal species

In total 127 cereal fragments (grains plus chaff) were recovered. Many of the cereal grains were fragmentary with their surfaces extensively cracked and, in some cases, distorted by surface blistering. This meant that only one grain could be tentatively assigned to species. The chaff fragments had lost many of their surface details.

Wheat (*Triticum* spp.)

In total 41 grains of wheat were identified, 29 glume bases, two spikelet forks, and 13 internodes.

Only one grain, from context 243/244, could be tentatively identified to species type. This grain had the characteristic rounded form of *Triticum aestivo-compactum* (bread/club wheat). Bread wheat varieties are, today, the dominant commercial wheats. Their rise to prominence dates back to the late Iron Age and Roman period, with bread/club wheat becoming the most frequently occurring type by the Anglo-Saxon period. Bread/club wheat has been associated with the use of heavy soils and labour intensive cultivation techniques (Jones 1981, 107). It is a free-threshing cereal - the grains are easily separated from the glumes.

Most of the grains examined were categorized as hexaploid wheats. These grains are likely to be either *T. aestivo-compactum* or *T. spelta* L. (spelt wheat). *T. spelta* frequently dominates Iron Age and Roman archaeobotanical assemblages, but the species disappears with the rise of bread/club wheats (Jones 1981, 106; Van der Veen 1992, 74). It is a glume wheat - the grain is held tightly by the glumes, so that extra processing is required to extract the grain. *T. spelta* is also associated by Jones (1981, 107) with the cultivation of heavy soils.

The surface patterning of the glume bases and spikelet forks was very indistinct. Therefore, to give some indication of species, the widths of the glume fragments were measured at the level of spikelet articulation (Illus. 5.31). According to the figures given by Helbaek (1952, 218), the majority of the glumes comply with the range for carbonized *T. spelta* (0.91-1.52mm).

Barley (*Hordeum* sp(p).)

Twenty-seven barley grains were identified and 15 internodes (one of which was an internode from the base of the rachis). No fragments could be identified further than the *Hordeum* sp(p). level due to poor preservation, so it is not possible to say, for example, whether 6-row barley is definitely represented. Barley is hardier than wheat and can be grown, potentially, throughout Britain, except where drainage is poor or the pH is below 6 (Bland 1971 quoted in Jones 1981, 105).

Non-cereal species

A number of other charred specimens were recovered, although not all identifications could be resolved to species level. Some signifiant physiological characteristics are listed below alongside the contemporary ecological preferences of each species or group.

Caprifoliacae

One member of this family was identified: *Sambucus nigra* (elder). This is a common shrub plant found in a variety of locations: woods, scrub and in waste places. It is especially characteristic of disturbed, base-rich and nitrogen-rich soils (Clapham *et al*. 1962, 788). It could have grown close to the site or have been transported there as the result of human or animal consumption.

Table 5.7

Bursea House. Stratified iron slag (numbers of fragments)

Period/Phase	A	B	C	D	E	F	unstratified
Cinder	-	-	1	4	1	-	1
Undiagnostic iron working slag	3	-	2	14	1	-	8
Smithing slag	1	-	1	-	-	-	-
Smelting slag	-	-	-	7*	-	-	7

* including one plano-convex furnace base

Table 5.8

Bursea House. The animal bones

Phase	Context	Bones
A	558	3 fragments of sheep/goat scapula
	559	Cattle incisor; cattle skull/horn core fragment; 3 cattle-sized bones Sheep/goat longbone
	565	Cattle skull fragment; two other fragments
C	214	Cattle tooth (M3)
	300	Horse tooth, lower cheek
	338	7 fragments of Cattle (femur 3; tibia 3; skull 1)
D i	157	Sheep/goat radius
	159	Cattle tooth (lower molar)
	339	3 fragments of Cattle (femur; calcaneum; unidentified) Sheep/goat tooth (M1 or M2)
	414	Horse/cattle-sized tooth
	553	Cattle tooth
D ii	248	Horse cheek tooth
E ii	54	Horse cheek tooth
	131	Cattle tooth (lower M1 or M2)
	190	Horse teeth (4 incisors; 6 upper cheek teeth)
	192	Horse cheek tooth
	194	Cattle tooth (molar)

Caryophyllaceae

Two members of this family were identified. *Stellaria media* (chickweed) is a common weed of arable and waste land. As this species grows fairly low on the ground, Hillman (1981, 150) has suggested that harvested crops which contain this species were reaped low on the ground. A single *Stellaria holostea* (greater stitchwort) seed was identified by its prominent surface tubercules. This species is a perennial woodland herb which inhabits a wide range of mull soils (Clapham *et al.* 1962, 242).

Chenopiaceae

Chenopodium album (fat hen) was identified in context 226. This is a very common plant found on arable and waste land and it is also frequently found in archaeobotanical assemablages. It is a nitrophilous species as are members of the genus *Atriplex* (Ellenberg 1979), which were also recovered. *Atriplex* spp. (orache) and *Chenopodium* spp. can be found in a variety of locations (Clapham *et al.* 1962, 271).

Cyperaceae

The Cyperaceae species and genera found at Bursea House are all associated with wet habitats. *Cladium mariscus* is generally found in reed-swamps and fens, usually on neutral or alkaline ground. *Eleocharis palustris* (common spike-rush) inhabits marshes, ditches and pond margins (Clapham *et al.* 1962, 1063). Despite this modern habitat, *E. palustris* is often found in association with ancient cereal grains (Jones 1981, 111) and Jones links their presence to the cultivation of low-lying ground.

Gramineae

The grass family is very large with members occurring across a wide range of habitats. Thirty-two grains of the species *Sieglingia decumbens* were recovered. This species, commonly known as heath-grass, is found today on acid grassland and locally on base-rich substrata (Clapham *et al.* 1962, 1122). Hillman (1981, 146), however, suggests that *Sieglingia decumbens* may once have been an arable weed prior to the introduction of the mouldboard plough which could destroy the plant's rhizome system.

Members of the *Bromus* genus were recovered from contexts 300 and 243/244. Bromus seeds are frequently found in Iron Age assemblages and were evidently an abundant arable weed, although less numerous after the late Iron Age (Jones 1988). The decline of *Bromus* has, with the decline of *Sieglingia decumbens*, been linked to the introduction of the mouldboard plough (Jones 1988). *Bromus* seeds were used as a famine food in recent history (Jones 1981, 109).

Avena (oat) awns from contexts 234 and 243/244 were also found. It is impossible to distinguish wild from cultivated oat species from the awns. Oats were cultivated during the Roman period, but wild oats are a very common arable weed.

One of the most remarkable aspects of the assemblage from Bursea House is the presence of graminous culm bases/rhizomes. In total one hundred and thirty-seven graminous culm bases/rhizomes were recovered. Two graminous culm nodes were also found.

Labiatae

One example of *Galeopsis* sp. was recovered from contexts 243/244. This genus, the hemp-nettles, lives in a range of habitats: arable and waste land, fens and wet heaths (Clapham *et al.* 1962, 756-67).

Plantaginaceae

One member of this family, *Litorella uniflora* (shore weed), was identified. The fruits of this species are very distinctive: they have a rippled surface texture with a large concave point of attachment which forms proximal end of the nutlet (Illus. 5.32). This species is found in both shallow water (up to 4m in depth) where its slender stolons can form an extensive turf and, when it is exposed, it is found on sandy and gravelly shores of non-calcareous lakes and ponds (Clapham *et al.* 1962, 767). It is more prevalent in the north of the British Isles (Godwin 1975, 332). These examples of carbonized *Litorella uniflora* are the only examples known to the author.

Polygonaceae

The Polygonaceae is another large family with members tolerating a wide range of habitats. Many of the seeds listed in this family fall into the category 'Polygonacae indeterminate' and includes many specimens which have lost their outer seed coat. Three species were identified. *Polygonum aviculare* (knotgrass) which is a very common weed found in waste places and arable land (Clapham *et al.* 1962, 545). *Polygonum lapathifolium* (pale persicaria) is a relatively common species found scattered throughout the British Isles in waste places, cultivated ground and beside ponds (Clapham *et al.* 1962, 533). Finally, *Rumex acetosella* (sheep's sorrel) is noteworthy because it prefers very acidic conditions. It is also fairly tolerant of moisture (Ellenberg 1979). Other examples of *Rumex* spp. (the docks and sorrels) were also found, but could not be identified to species.

Portulacaceae

Two examples of the species *Montia fontana* ssp. *chondrosperma* (blinks) were found in contexts 112 and 114. This species prefers damp habitats: streamsides, springs, and moist pastures (Ellenberg 1979). It is found especially on non-calcareous sub strata (Clapham *et al.* 1962, 267).

5.5.4 Kiln fabric

During excavation of the kilns, it was noted that there were plant impressions on the fragments of kiln fabric. A sample of this was selected by the excavator for analysis.

The kiln fabric was covered with impressions left by grass or Cyperaceae leaves (Illus. 5.33). It is impossible to say which species are represented. Only one seed impression, an indeterminate grass, was found. The vegetative matter was very 'crumpled', a factor which may suggest that the material had rotted slightly before its inclusion in the kiln lining.

5.5.5 Composition of the samples

The low frequencies of material recovered from Bursea House make comparisons between phases and contexts difficult. Statistical manipulation is inappropriate in this case because the numbers involved are so low.

Whilst most contexts contain very low frequencies of material, there are a few samples which are comparatively rich (see samples 315, 300, and 243/244). The richer samples are found in the earlier Periods (A-D, the first to early fourth centuries A.D.)

There is a remarkable consistency in the make-up of the richer samples. Cereal fragments are present - usually barley and wheat grains with glume bases and rachis fragments. Graminous culm bases/rhizomes are also present. The most frequently represented wild taxa are members of the Cyperaceae and Polygonaceae families with *Litorella uniflora* and *Sieglingia decumbens*. Traces of the same pattern is also seen in samples containing fewer carbonized remains, a pattern which is seen across all phases.

There does not appear to be any clear relationship between context type and the concentration of carbonized remains.

5.5.6 Reconstruction

The nature of the evidence

The results given are for charred remains only. This means that the material has come into contact with fire at some point in its predepositional history. Charred remains from archaeological sites are usually linked either with accidental or intentional burning on a hearth or, on the other hand, with events in the crop-processing sequence which involve fire (Dennell 1972; Hillman 1981) such as drying, parching and cooking. At Bursea House, however, the obvious source of fire for charring is the kiln itself -burning which is not directly involved with cereal processing. The use of this site for industrial, not agricultural, purposes may explain the low frequency of cereal remains on site.

The cereal remains recovered, in addition, were not very well preserved. This damage may have been incurred during charring or may be the result of depositional and post-depositional factors. This area has a low and variable water table which may, by the action of wetting and drying, cause damage to charred remains.

Most of the samples come from ditches and post holes. These are usually thought of as 'secondary' contexts - the material is redeposited from another context (such as a hearth). It is interesting that the samples which come from occupation levels and the kiln itself, contexts which are likely to represent 'primary' deposition, are not the richest samples. Instead, some of the samples from ditch contexts produced the highest concentration of carbonized material. This might suggest clearing out and dumping of material in the ditches.

Environment

Two main habitats are represented by a number of the wild taxa at Bursea House:

Damp conditions:	*Eleocharis palustris* *Cladium mariscus* *Carex* spp. *Litorella uniflora* *Montia fontana* ssp. *chondro sperma*
Acid ground:	*Sieglingia decumbens* *Rumex acetosella*

The prominence of taxa which prefer wet conditions is very striking. Other enviromental evidence demonstrates

Table 5.9

Bursea House. The carbonized plant remains

Phase	A	A	A	A	A	A	B	C	D	D	D	D	D	D	D	D	D	D
Context	315	565	642	648	653	661	172	290	114	204	207	211	216	228	234	243/4	248	424
Feature type	D	D	D	D	D	D	D	D	Occ	D	D	D	D	D	D	K	D	D
Species																		
Capriofilaceae																		
Sambucus nigra L.	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-
Caryophyllaceae																		
Stellaria holostea L.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stellaria media L.	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Chenopodiaceae																		
Atriplex spp.	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Chenopodium album agg.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium spp.	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Cyperaceae																		
Carex spp. (lenticular)	3	-	-	-	-	-	-	-	-	-	1	-	-	-	-	3	-	-
Carex spp. (trigonous)	6	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-
Cladium mariscus L.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Eleocharis palustris L.	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Eleocharis spp.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Gramineae																		
Avena spp. awn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	10	-	-
Bromus spp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Sieglingia decumbens (L.) Bernh.	4	-	-	-	-	-	-	-	1	-	2	-	-	1	2	3	2	-
Hordeum sp(p). grain	1	1	1	-	-	-	3	1	5	1	1	-	-	1	-	-	-	-
Hordeum sp. basal internode	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hordeum sp(p). rachis internode	1	-	-	-	-	-	-	-	-	-	-	-	1	-	2	5	1	-
Triticum cf. *aestivo-compactum* grain	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Triticum spp. grain (hexaploid)	-	-	-	-	-	-	2	-	8	-	2	-	-	-	-	-	3	-
Triticum spp. grain	8	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spp. glume	-	-	1	-	-	1	2	-	6	-	-	-	2	-	4	-	-	-

Phase	A	A	A	A	A	A	B	C	D	D	D	D	D	D	D	D	D	D
Context	315	565	642	648	653	661	172	290	114	204	207	211	216	228	234	243/4	248	424
Feature type	D	D	D	D	D	D	D	D	Occ	D	D	D	D	D	K	D	D	D
Species																		
Triticum spp. spikelet fork	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spp. rachis internode	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Cerealia spp. grain	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	5	-	-
Gramineae culm base/rhizome	43	4	7	-	-	-	1	-	5	1	2	-	1	-	5	15	4	-
Gramineae culm node	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Gramineae undiff.	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Labiatae																		
Galeopsis sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Plantaginaceae																		
Litorella unifora L.	1	-	1	-	-	-	-	-	-	1	1	-	-	1	-	1	-	-
Polygonaceae																		
Polygonum aviculare agg.	5	-	-	-	-	-	1	-	-	-	-	-	-	-	-	2	-	-
Polygonum lapathifolium L.-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	3	-	-	
Polygonum spp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex acetosella L.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex spp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-
Polygonaceae undiff.	30	-	1	-	-	-	1	-	5	-	2	-	1	-	-	20	8	-
Portulaceae																		
Montia fontana ssp. *chondrosperma* (Fenzl) Walters	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Undifferentiated nut fragment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
Indeterminate	-	1	4	-	-	-	-	-	3	-	5	-	1	-	1	5	2	-
No carbonized remains				X								X						X

NOTE

D = ditch Occ = occupation layer PH = post hole K = kiln

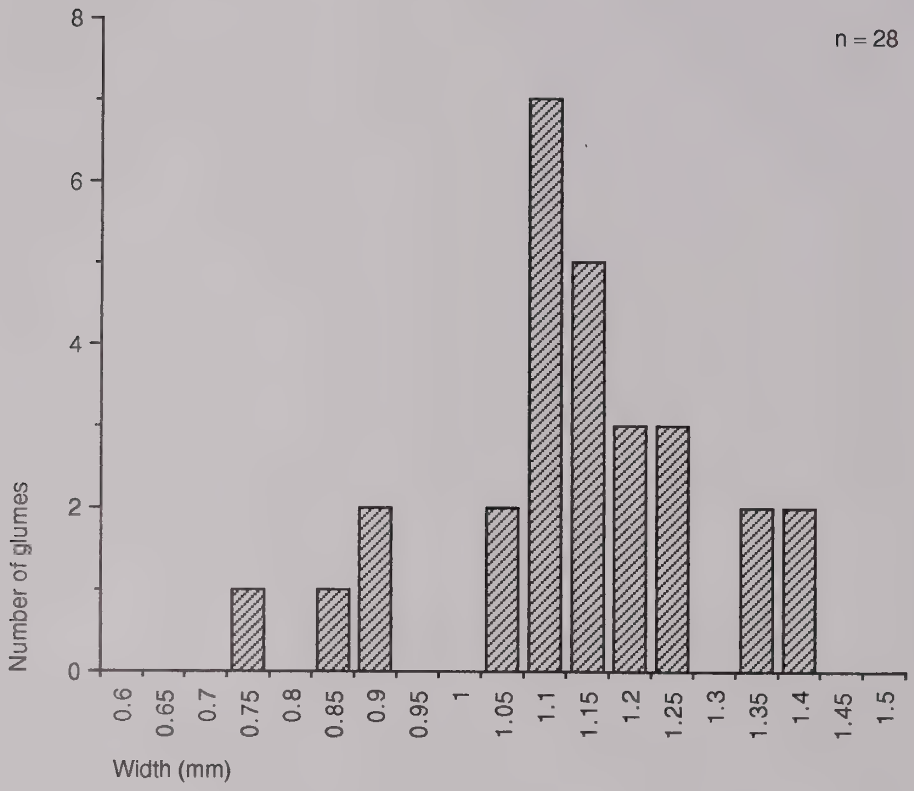
Table 5.9

Bursea House. The carbonized plant remains (continued)

Phase	D	D	D	D	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Context	454	512	531	615	28	47	61	63	112	121	145	153	159	164	190	226	257	260	300
Feature type	D	PH	K	D	D	PH	PH	PH	PH	PH	PH	PH	D	D	D	D	D	D	D
Species																			
Capriofilaceae																			
Sambucus nigra L.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caryophyllaceae																			
Stellaria holostea L.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Stellaria media L.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodiaceae																			
Atriplex spp.	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1
Chenopodium album agg.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Chenopodium spp.	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Cyperaceae																			
Carex spp. (lenticular)	-	1	-	-	-	-	-	1	1	-	-	-	-	-	1	1	-	1	5
Carex spp. (trigonous)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Cladium mariscus L.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Eleocharis palustris L.	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	2
Eleocharis spp.	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Gramineae																			
Avena spp. awn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus spp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Sieglingia decumbens (L.) Bernh.	1	-	1	-	-	-	-	1	1	2	2	-	-	-	1	1	-	-	7
Hordeum sp(p). grain	-	-	1	1	-	-	-	-	1	-	-	-	-	-	1	1	-	1	6
Hordeum sp. basal internode	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Hordeum sp(p). rachis internode	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	2
Triticum cf. *aestivo-compactum* grain	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spp. grain (hexaploid)	-	-	-	-	-	-	-	-	3	-	-	-	-	1	1	-	-	-	-
Triticum spp. grain	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	7
Triticum spp. glume	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	-	-	7

Phase	D	D	D	D	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Context	454	512	531	615	28	47	61	63	112	121	145	153	159	164	190	226	257	260	300
Feature type	D	PH	K	D	D	D	PH	PH	PH	PH	PH	PH	D	D	D	D	D	D	D
Species																			
Triticum spp. spikelet fork	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Triticum spp. rachis internode	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	9
Cerealia spp. grain	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Gramineae culm base/rhizome	2	-	-	-	-	-	-	2	10	-	-	-	-	-	1	-	-	-	34
Gramineae culm node	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Gramineae undiff.	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	1
Labiatae																			
Galeopsis sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plantaginaceae																			
Litorella unifora L.	-	1	-	1	-	-	-	1	1	-	-	1	-	-	-	1	-	1	7
Polygonaceae																			
Polygonum aviculare agg.	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonum lapathifolium L.-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	
Polygonum spp.	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-
Rumex acetosella L.	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Rumex spp.	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	1
Polygonaceae undiff.	1	1	2	-	-	1	-	-	3	-	-	-	-	-	-	2	-	3	4
Portulaceae																			
Montia fontana ssp. *chondrosperma* (Fenzl) Walters	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Undifferentiated nut fragment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indeterminate	-	-	1	-	-	-	-	1	1	-	1	-	-	-	-	2	-	3	-
No carbonized remains					X								X						

NOTE
D = ditch
Occ = occupation layer
PH = post hole
K = kiln



Illus. 5.31 *Bursea House. Histogram of glume widths measured at the level of the spikelet articulation*

that the enviroment around Holme-on-Spalding Moor was once much wetter than today. The shore-line was further inland with the area existing on the margins of an estuarine creek system (above Chapter 1.4). The taxa recovered from Bursea House come from freshwater habitats - the inclusion of *Carex* spp. and particularly *Litorella uniflora* suggests that some of the plant remains were derived from areas in and around standing freshwater.

The inclusion of acid and free-draining ground taxa may be associated with the drier sand hilltops found in the area. Field-walking has shown that there is a correlation between these sand hilltops and Roman sites (above Section 2.3.4).

Economic activity

Two main activities appear to be reflected in the macrobotanical evidence. First, the cereal fragments and some wild species, such as *Chenopodium album, Polygonum lapathifolium* and *Bromus* sp(p)., are associated with arable cultivation (cf. Van der Veen 1992, table 6.4). These fragments could represent material brought onto site for consumption, wastes brought for burning, or they may have been growing at, or very close to, the site. Secondly, the samples also contain substantial numbers of graminous culm bases/ rhizome fragments. These fragments could be associated with either peat/turf cuttings or the uprooting of grasses during collection. Turfs could have been cut to cover the kiln during firing (M. Millett *pers. comm.*) and peat may have been used to fire the kiln itself, although the charcoal analysis does perhaps suggest that coppiced woodland was the main source of fuel (below Chapter 8.1). Impressions on the kiln fabric shows that grass and/or Cyperaceae (sedge and rush) leaves were collected. As Bursea House was situated in a comparatively wet environment, it is possible that these remains were not collected very far from the site. There are no impressions of basal nodes/rhizomes on the pieces of kiln fabric themselves.

Most of the wild taxa recovered are derived from damp and acidic habitats. For some species, such as *Sieglingia decumbens*, *Eleocharis palustris*, *Montia fontana* ssp. *chondrosperma*, and *Polygonum lapathifolium*, it is difficult to distinguish whether these species are associated with the collection of grasses and turfs/peat, cereal cultivation, or whether they represent a combination of all three. Some taxa, especially *Litorella uniflora*, *Cladium mariscus* and *Carex* spp., are not usually associated with arable cultivation and may be more closely linked with the collection of material beside wet areas.

Thus there is evidence both for arable cultivation and the collection of materials which would be involved in the industrial processes at Bursea House. It is possible that the cereals and arable weeds could have been brought onto the site as contaminants during grass or turf collection. It is difficult to discern whether cereals were brought onto site intentionally or coincidentally.

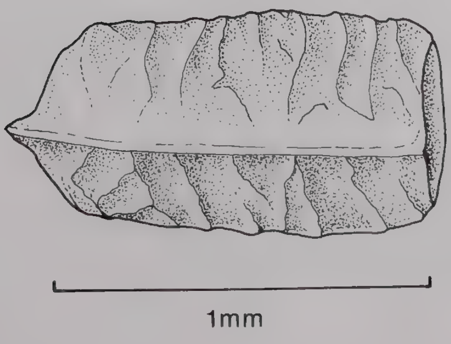
There is no evidence which confirms or rejects the theory that the kilns were used during agriculturally slack periods (Millett and Halkon 1988, 43).

5.5.7 Conclusions

At the start of the analysis, the excavator posed three specific questions. Were crops grown in the immediate vicinity of the site? Is there any evidence for the collection of specific materials for the industrial process? Finally, was there any evidence which would suggest seasonal use of the kilns? Each of these questions will be dealt with in turn.

There is evidence for cultivation and three types of cereals were recovered in low frequencies: barley, spelt, and possibly bread/club wheat. It is not clear, however, whether these were cultivated in the immediate vicinity of the kilns or brought in from further afield. The inclusion of acid-loving wild species such as *Rumex acetosella* and *Sieglingia decumbens* suggests that cultivation took place on the drier sand hilltops found in the area. It is possible, however, that there was some cultivation in low-lying damper areas, but most of the wild taxa associated with damper conditions probably derive from activities associated with the industrial nature of the site.

The carbonized assemblage is perhaps most remarkable for the inclusion of large numbers of grass culm bases/rhizomes and wild taxa which prefer wet habitats. In the latter category, the inclusion of *Litorella uniflora* (shore-weed) is of particular note. It is suggested here that these remains represent the collection of material from wet and grassy areas for the industrial process. The leaf impressions on the kiln fabric demonstrate that grasses, and possibly sedges, were collected for use in the kiln structure. It is possible that the structures were also covered with turfs - the likely origin for the grass culm bases/rhizomes. No conclusive evidence was found which could relate the operation of the kilns with a particular season.



Illus. 5.32 *Bursea House. Litorella uniflora (shore-weed) specimen from context 63*

In addition to the questions posed by the excavator, the presence of wild taxa deriving from wet habitats coincides well with other environmental evidence which demonstrates that the area around Holme-on-Spalding Moor was much wetter during Roman times.

Acknowledgements

I would like to thank Martin Jones for his help during the course of this work and for comments on an earlier draft. I would also like to thank Allan Hall, Jacqui Huntley and Marijke van der Veen for assistance with identifications.

5.6 The pottery

by John Creighton

About 105kg of pottery was recovered during the excavations at Bursea House, 80.98 percent of this (by weight) came from fabrics almost certainly produced at the excavated kilns. The rest can be divided into three categories. First, local hand-made fabrics (15.54 percent), secondly other local wheel-made greywares from East Yorkshire (0.95 percent), and finally a variety of imported sherds from further afield (2.54 percent). Table 5.10 shows that the kiln products dominate the assemblage in all phases, except at the start of the sequence where hand-made vessels predominate.

The aim of the ceramic report is two fold, first to provide a clear fabric and form series characterizing the output of the kilns, and secondly to establish a chronology for the kiln's products. The report is divided into four parts:

5.6.1 The wheel-made products of Bursea House and the Holme-on-Spalding-Moor industry
5.6.2 The hand-made wares
5.6.3 Other ceramics present
5.6.4 Chronology and Discussion

In dating many of the local wheel-made and hand-made fabrics, cross references are made to the Hawling Road fabric series (below Chapter 7.6) where the same fabrics occurred in association with more chronologically diagnostic pottery.

5.6.1 The wheel-made products of Bursea House and the Holme-on-Spalding Moor Industry

Six principal fabric groups were identified as representing the Bursea House kiln products (A1-3, B, C and D) (Table 5.10). However, a small number of other fabrics were also identified as probably being local products (LW1-6), but since no waster sherds were observed, attribution to these particular kilns is problematic.

The kiln products

Bursea A1	Blue grey core, margins and surfaces; some fine sand temper *c*.0.1-2mm; occasional small fragments of black ironstone. Minor variants could have crisper fractures and darker cores.
Bursea A2	This fabric group is a variant of Group A1. Light grey core, margins and surfaces, some fine sand temper *c*. 0.1-0.3mm; very occasional calcareous sand temper *c*. 0.1mm; and very rare red-brown ironstone inclusions *c*. 0.5mm. Softer than fabric A1. Occasionally sherds would have some vegetable impression voids up to 3mm in length, though there was no vegetable tempering in the fabric itself. The colour could vary significantly from light grey to darker and blue-grey shades.
Bursea A3	This fabric group was rather sandier than A1 or A2. Blue grey core, orange-brown margins, grey surfaces; abundant moderate sand temper 0.2-0.4mm. [All three fabrics were classified as R07 at Hawling Road]
Bursea B	Common reduced fabric with dark grey core, lighter grey margins and surfaces; common angular translucent quartz inclusions *c*. 1-2mm; some black angular inclusions *c*. 1-2mm; some ironstone up to 3mm. The colour varied significantly, whilst two-thirds was light grey, a large proportion was brownish-grey, and a trace a variety of other orange and brown shades. Usually considered to be later third century, however the fabric is known from Shiptonthorpe from the second century (J. Evans, *pers. comm.*). [Hawling Road Fabric G101]

Probable Bursea products

Bursea C	Similar to A2, but with a dark grey core, lighter grey margins and surfaces; some fine sand temper *c*. 0.2-3mm; but might not be a Bursea product.
Bursea D	Orange oxidized core, grey margins and surfaces; some fine sand *c*. 0.1-0.2mm occasional calcareous sand *c*. 0.1-0.2mm.

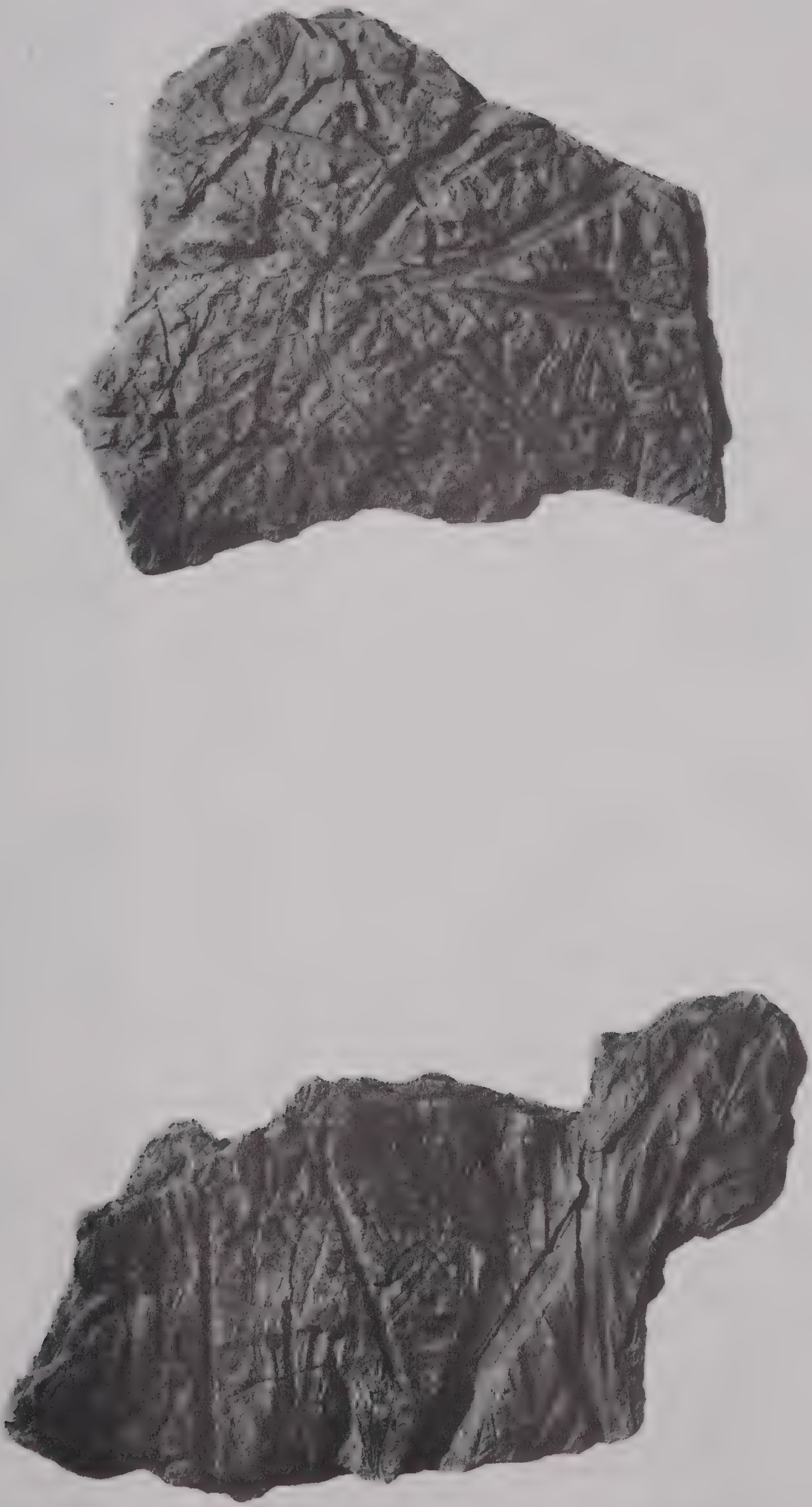
Other local wheel-made products (Illus. 5.11)

Fabrics used for Mortaria

LW1	Mortarium flange (form M3), mid second-century, white slipped oxidized mortarium, some common fine sand *c*. 0.2mm; occasional brown ironstone *c*. 0.5-1.0mm. Yellow slip. Definitely northern, probably local manufacture. Several fragments were found, almost certainly belonging to the same vessel. The unstratified sherd showed signs of a repair. Five fragments totalling 426.5g and 24 EVEs of this fabric were found from Periods Di, F and unstratified.
LW2	Abraded oxidized mortarium flange (form M4), common coarse translucent and white sand 0.3-0.5mm; very occasional angular black inclusion 2mm; occasional brown ironstone up to 3mm. Probably second-century of East Yorkshire manufacture, similar to a fabric found at Shiptonthorpe. Only one fragment of 97g and 9 EVEs were found in Period Dii.

Other fabrics

LW3	Soft, fine reduced fabric with a 'soapy' texture; black core, thin light grey margins, dark grey burnished surfaces; no visible tempering. Possibly first/second-century. Only 4.5g of this fabric was found in Period C. [Hawling Road Fabric R24]
LW4	Hard, over fired reduced fabric. Dark blue-grey core, red-brown margins, dark blue-grey surfaces; common calcareous sand inclusions *c*. 0.2-0.5mm. One of the sherds was a slightly wobbly waster, possibly indicating production near the Bursea kiln site. Since this fabric occurs in the first phase, its dating is very significant for the series. It is a major fabric at Shiptonthorpe during the second century, but potentially starts earlier. At Hawling Road it was found in contexts from the later first and earlier second century (contexts 500, 1017, 533 and 4007), and its surface distribution did not correlate with the third- and fourth-century field-scatter. [Hawling Road Fabric R35]
LW5	Reduced ware, grey core, brownish-grey margins, dark grey surfaces, some/common moderate sand temper 0.2-0.3mm; occasional black iron stone inclusions 0.5-1.0mm. At Hawling Road it was found in Flavian to mid second-century deposits (contexts 533, 1133 and 4014). It can be assumed that the 126.5g from Period Di is residual. [Hawling Road Fabric R191]
LW6	Black core, buff margins, dark grey surfaces; common fine sand c. 0.2mm. Possibly earlier than main Holme-on-Spalding Moor output, may not be Holme-on-Spalding Moor. At Hawling Road this was found in later first- to early second-century deposits (contexts 1017, 1133 and 547). It can be assumed that most of the material from Period C onwards is probably residual. [Hawling Road Fabric R19]



Illus. 5.33 *Bursea House. Photographs of two sample fragments of kiln fabric (roofing) from Kiln 2 showing impressions left by grass or Cyperaceae leaves*

The Holme-on-Spalding Moor form series

An attempt has been made to draw together the information from all the Holme-on-Spalding Moor kiln excavations to create a unified typology for the industry's products. This builds on the typology originally presented by Halkon (1987). Throughout references are made to the excavations at Throlam (Corder 1930) and Hasholme Hall (Hicks and Wilson 1975). Each form is dealt with in turn and a broad description given. Then the production centres are identified. Where Throlam or Hasholme Hall are indicated the numbers following refer to the catalogue entry in the respective report. Where Bursea House is indicated the proportion of each fabric in which it appears is given, together with the total sample size in EVEs, and finally the proportion of the kiln products (fabrics A-D) which this form represents. The unsourced fabrics LW1-6 are also indicated where they occur. Next, where possible, an indication of the size of the vessels from each production centre is given. Then an indication of the chronology is provided from the excavation evidence. Finally the source of the example illustrated is given. Normally this is from the Bursea excavations, but where the original Throlam and Hasholme excavations provided better examples, or where the forms did not occur at Bursea, then these have been used instead.

Bowls

B01	Deep bowls / wide-mouth jars	1123 EVEs	12.3%
B02	Small bowl with wide mouth and small moulded base	289 EVEs	3.2%
B03-5	Pedestal bowls	105EVEs	1.1%
B06	Straight sided bowl	849 EVEs	9.3%
B07	Straight sided bowl with down-turned rim	62 EVEs	0.7%
B08	Straight sided bowl with embryonic flange	65 EVEs	0.7%
B09-11	Straight sided bowl with fully fledged flange	114 EVEs	1.2%
B12-18	Miscellaneous bowl forms	132 EVEs	1.4%
	Total bowls	2739 EVE	30.0%

B01: deep bowls / wide-mouth jars

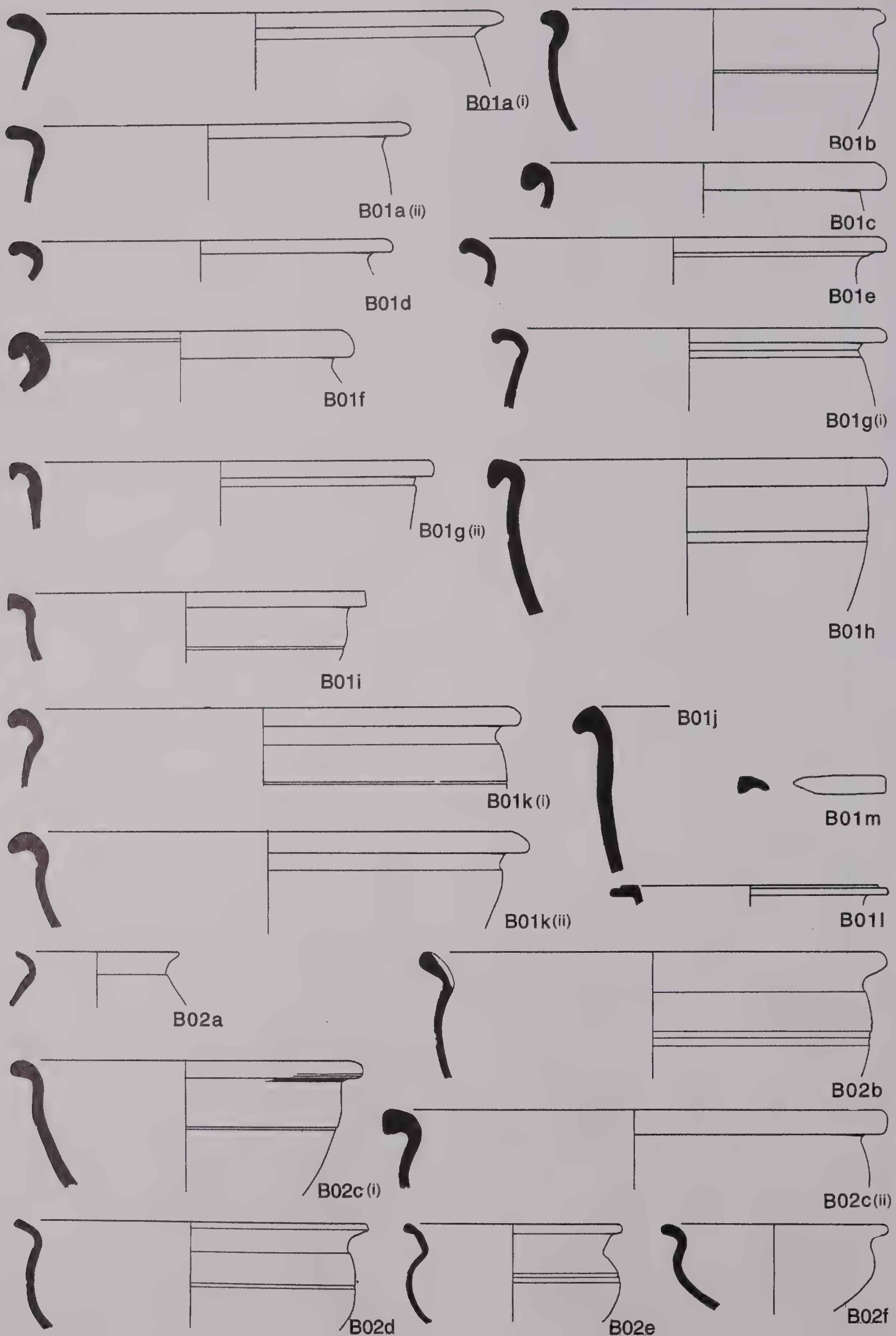
At Crambeck, such forms only accounted for c. 4 percent of the output. They were far more significant at Throlam however, and at Bursea House they make up 13.2 percent of the wheel-made products (fabrics A-D).

B01a	Description:	Deep bowl/wide mouth jar
	Production:	Throlam 27, 28 Hasholme 12, 14 Bursea House A1 11 percent; A2 79 percent; C 10 percent (Total 685 EVEs, 7.5 percent)
	Size:	Bursea House: 250 ± 40mm (n = 29) Throlam: c. 230mm Hasholme: c. 210 and 340mm
	Chronology:	Bursea House: 34 stratified examples in Period C to F (mainly in Di and F) Hasholme: Kiln 2
	Example:	Illus. 5.34 first example from context 131; second from context 416
B01b	Description:	Deep bowl/wide mouth jar
	Production:	Hasholme 13 Bursea House A1 26 percent; A2 74 percent (Total 159 EVEs, 1.7 percent) Size: Bursea House: 245 ± 34mm (n = 9) Hasholme: c. 250mm
	Chronology:	Bursea House: 10 stratified examples in Period Di to F (mainly in Dii and F) Hasholme: Kiln 2 Example: Illus. 5.34 example from context 198B01c
B01c	Description:	Deep bowl/wide mouth jar
	Production:	Throlam 20 Bursea House A2 100 percent (Total 11 EVEs, 0.1 percent)
	Size:	Bursea House: 235 ± 30mm (n = 4) Throlam: c. 230mm
	Chronology:	Bursea House: one stratified example in Period F
	Example:	Illus. 5.34 example from context 403
B01d	Description:	Deep bowl/wide mouth jar
	Production:	Throlam 24, 41 Bursea House A2 73 percent; C 27 percent (Total 22 EVEs, 0.2 percent)
	Size:	Bursea House: 260 ± 28mm (n = 2) Throlam: c. 330-360mm
	Chronology:	Bursea House: one stratified example in Period Di
	Example:	Illus. 5.34 example from context +
B01e	Description:	Deep bowl/wide mouth jar
	Production:	Throlam 39, 40, 22 Bursea House A1 15 percent; A2 77 percent; C 8 percent (Total 62 EVEs, 0.7 percent)
	Size:	Bursea House: 260 ± 280mm (n = 2) Throlam: c. 330-370mm
	Chronology:	Bursea House: no stratified examples
	Example:	Illus. 5.34 example from (4)
B01f	Description:	Deep bowl/wide mouth jar
	Production:	Throlam: 30, 36, 37
	Size:	Throlam: *c.* 330-370mm
	Chronology:	Bursea House: no stratified examples
	Example:	Illus. 5.34 example from context 505
B01g	Description:	Deep bowl/wide mouth jar
	Production:	Throlam 21, 31 Hasholme 15 Bursea House A1 35 percent; A2 65 percent (Total 34 EVEs, 0.4 percent)
	Size:	Bursea House: 280 ± 0mm (n = 2) Throlam: *c.* 310-330mm
	Chronology:	Bursea House: two stratified examples in Periods D to Dii
	Example:	Illus. 5.34 first example from context162, second example from context 402

Table 5.10

Bursea House. The proportion of different fabrics by weight (g) in each period

Period	Bursea House Products						Local wheel-made	Local hand-made	More distant imports				Total Pottery
	A1	A2	A3	B	C	D			Crambeck	Gauloise 4	X1	Samian	
(+)	609	23626	0	4892	4362	235	310	1555	20	13	535	0	36157
A	0	641	0	412	125	0	70	2075	0	0	25	0	3348
A?	0	155	0	40	0	0	15	5080	0	0	0	0	5290
B	0	233	0	87	7	44	5	28	0	0	10	0	414
C	0	4207	91	1892	593	0	111	1247	0	0	58	0	8199
Di/ii	0	4560	0	2995	860	0	0	740	0	0	650	30	9835
Di	137	12776	0	3819	1621	10	206	1140	0	0	619	15	20343
Dii	259	5454	0	1687	306	0	111	165	0	10	272	0	8264
Ei	18	96	0	37	34	0	0	0	0	0	77	0	262
Eii	0	45	0	0	0	0	0	3200	46	0	0	0	3291
F	84	5673	0	1598	868	26	168	1118	28	127	42	0	9732
Total	1107	57466	91	17459	8776	315	996	16348	94	150	2288	45	105135



Illus. 5.34 Pottery typology forms B01a - B02f. Scale 1:4

B01h	Description:	Deep bowl/wide mouth jar
	Production:	Throlam 23, 38, 35
	Size:	Throlam: *c.* 280-330mm
	Chronology:	-
	Example:	Illus. 5.34 example from Throlam 23
B01i	Description:	Deep bowl/wide mouth jar
	Production:	Throlam 26, 29 Bursea House C 100 percent (Total 6 EVEs, >0.1 percent)
	Size:	Throlam: 260 and 340mm
	Chronology:	Bursea House: no stratified examples
	Example:	Illus. 5.34 example from context +
B01j	Description:	Deep bowl/wide mouth jar
	Production:	Throlam 33
	Size:	no data
	Chronology:	-
	Example:	Illus. 5.34 example from Throlam 33
B01k	Description:	Deep bowl/wide mouth jar
	Production:	Bursea House: A1 7 percent; A2 60 percent; C 33 percent (Total 132 EVEs, 1.4 percent)
	Size:	Bursea House: 300 ± 280mm (n = 2)
	Chronology:	Bursea House: seven stratified examples in Periods B to F (mainly in F)
	Example:	Illus. 5.34 first example from context 198, second example from context +
B01l	Description:	Deep bowl/wide mouth jar
	Production:	Bursea House A1 100 percent (Total 5 EVEs, >0.1 percent)
	Size:	-
	Chronology:	Bursea House: one stratified example in Period F
	Example:	Illus. 5.34 example from context 65
B01m	Description:	Deep bowl/wide mouth jar
	Production:	Bursea House A2 100 percent (Total 7 EVEs, >0.1 percent)
	Size:	300mm (n = 1)
	Chronology:	Bursea House: no stratified examples
	Example:	Illus. 5.34 example from context 417

B02: small bowl with wide mouth and small moulded base
A number of thickened perforated bases for use as colanders were found. Alas none was found to form a complete profile, however, judging from parallels at Throlam many of these related to form B02.

B02a	Description:	Small bowl with wide mouth and small moulded base
	Production	Throlam: 50, 51 Hasholme: 24 (kiln 1) Bursea House: A2 100 percent (80 EVEs, 0.9 percent)
	Size:	Bursea House: 230 ± 420mm (n = 2) Throlam: *c.* 200mm, and one small example *c.* 90mm Hasholme: *c.* 150mm
	Chronology:	Bursea House: three stratified examples in Period Di Example: Illus. 5.34 example from context 4
B02b	Description:	Small bowl with wide mouth and small moulded base
	Production:	Throlam 52, 53, 54, 55, 48 Bursea House A1 24 percent; A2 31 percent; C 44 percent (Total 45 EVEs, 0.5 percent)
	Size:	Bursea House: 273 ± 57mm (n = 3) Throlam: *c.* 150-200mm
	Chronology:	Bursea House: four stratified examples in Periods C to F (two in D)
	Example:	Illus. 5.34 example from context 439
B02c	Description:	Bowl with wide mouth and small moulded base
	Production:	Throlam 34, 44 and 47 Bursea House A2 100 percent (Total 24 EVEs, 0.3 percent)
	Size:	Bursea House: 180mm (n = 1) Throlam: *c.* 180mm
	Chronology:	Bursea House: one stratified example in Period Di

Table 5.11

Bursea House. Non-Bursea, but local wheel-made fabrics (by weight)

	LW1	LW2	LW3	LW4	LW5	LW6	Total
Period A	-	-	-	85.0	-	-	85.0g
Period B	-	-	-	5.0	-	-	5.0g
Period C	-	-	4.5	-	-	106.5	111.0g
Period Di	60.0	-	-	-	126.5	20.0	206.5g
Period Dii		97.0	-	-	-	14.5	111.5g
Phase F	156.5	-	-	-	-	12.0	168.5g
Unstratified	210.0			85.0	-	15.0	310.0g
Total	426.5	97.0	4.5	175.0	126.5	168.0	997.5g

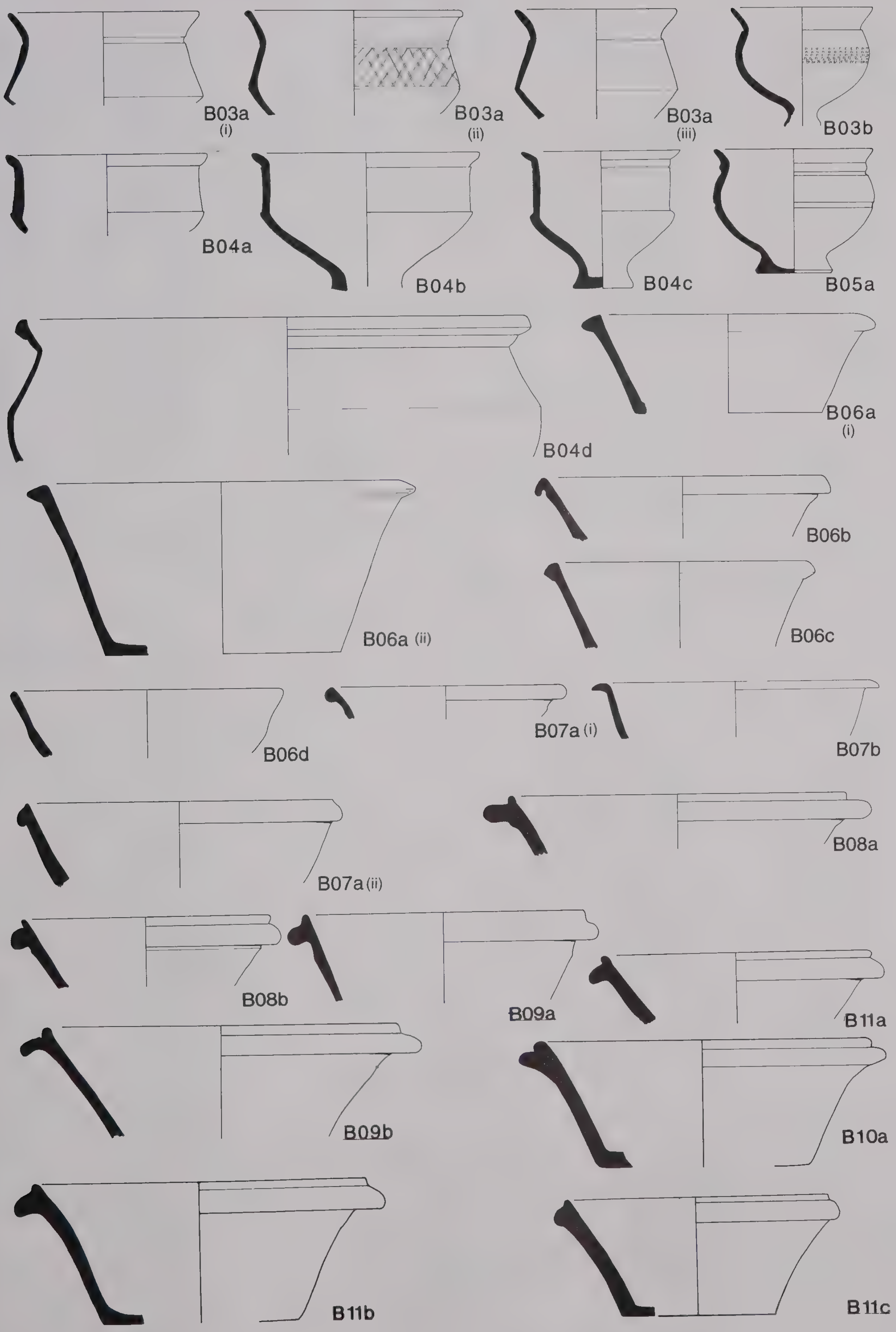
	Example:	Illus. 5.34 first example from context +, second from Throlam 34
B02d	Description:	Small bowl with wide mouth and small moulded base
	Production:	Throlam: 45, 46 Bursea House: A1 40 percent; A2 60 percent (Total 72 EVEs, 0.8 percent)
	Size:	Bursea House: 260mm (n = 1) Throlam: *c.* 210mm
	Chronology:	Bursea House: five stratified examples in Periods D and Di
	Example:	Illus. 5.34 example from context 505
B02e	Description:	Small bowl with wide mouth and small moulded base
	Production:	Throlam 42 Bursea House A2 100 percent (Total 31 EVEs, 0.3 percent)
	Size:	Throlam: *c.* 180mm
	Chronology:	Bursea House: one stratified example in Period F
	Example:	Illus. 5.34 example from context 12
B02f	Description:	Small bowl with wide mouth and small moulded base
	Production:	Throlam 43 Bursea House A2 60 percent; C 40 percent (Total 37 EVEs, 0.4 percent)
	Size:	Throlam: *c.* 190mm
	Chronology:	Bursea House: two stratified examples in Period Di and F
	Example:	Illus. 5.34 example from Throlam 43

B03-5: pedestal bowls

B03a	Description:	Tall biconical bowl (Gillam 178)
	Production:	Hasholme 22, 23 Bursea House A2 89 percent; C 11 percent (Total 89 EVEs, 1.0 percent)
	Size:	Bursea House: 172 ± 32mm (n = 4) Hasholme: *c.* 90 and 150mm
	Chronology:	Bursea House: six stratified examples in Periods A to D
	Example:	Illus. 5.35 first example from context 513, second from context 556 and third from context 272
B03b	Production:	Hasholme 25
	Size:	*c.* 100mm
	Example	Illus. 5.35 Hasholme 25
B04a	Production:	Throlam 105
	Size:	*c.* 150mm
	Example	Illus. 5.35 Throlam 105
B04b	Production:	Throlam 103
	Size:	*c.* 160mm
		Illus. 5.35 Throlam 103
B04c	Production:	Throlam 104
	Size:	*c.* 120mm
		Illus. 5.35 Throlam 104
B04d	Description:	Pedestal bowl
	Production:	Bursea House A1 100 percent (Total 16 EVEs, 0.2 percent)
	Size:	340mm (n = 1)
	Chronology:	Bursea House: no stratified examples
	Example:	Illus. 5.35 example from context 501
B05a	Production:	Throlam 99
	Size:	*c.* 110mm
		Illus. 5.35 Throlam 99

B06: straight sided bowls

B06a	Description:	Straight sided bowl, with slight rounded protruding rim
	Production:	Hasholme 27, 28 Bursea House A1 7 percent; A2 63 percent; B 6 percent; C 24 percent (Total 465 EVEs, 5.1 percent)
	Size:	Bursea House: 193 ± 31mm (n = 7) Hasholme: *c.* 250 and 310mm
	Chronology:	Bursea House: 28 stratified examples in Periods A to F (mainly in Di and F) Generally these appear in the second century and continue for a long time
	Example:	Illus. 5.35 first example from context 272, second from context 505
B06b	Description:	Straight sided bowl, with rolled over protruding rim
	Production:	Bursea House A2 45 percent; B 5 percent; C 50 percent (Total 298 EVEs, 3.3 percent)
	Size:	204 ± 38mm (n = 5)
	Chronology:	Bursea House: 11 stratified examples in Periods C to F (mainly in Di and Dii) Generally these appear in the second century and continue for a long time
	Example:	Illus. 5.35 example from (402)
B06c	Description:	Straight sided bowl, with a protruding rim flush with the top of the vessel
	Production:	Bursea House A2 56 percent; B 44 percent (Total 50 EVEs, 0.6 percent)
	Size:	-
	Chronology:	Bursea House: 4 stratified examples in Periods C to Dii
	Example:	Illus. 5.35 example from context 272
B06d	Description:	Straight sided bowl, plain rim
	Production:	Bursea House C 10 percent (Total 36 EVEs, 0.4 percent)
	Size:	220mm (n = 1)
	Chronology:	Bursea House: 2 stratified examples in Periods Di and F
	Example:	Illus. 5.35 example from context 4



Illus. 5.35 Pottery typology forms B03a - B11c. Scale 1:4

B07: straight sided bowl with down-turned rim

B07a Description: -
Production: Hasholme 26
Bursea House B 18 percent; C 82 percent (Total 45 EVEs, 0.5 percent)
Size: Bursea House: 236 ± 55 (n = 3)
Chronology: Bursea House: 2 stratified examples in Period C
Hasholme kiln 2
Example: Illus. 5.35 first example from context +, second from context 402

B07b Description: -
Production: Bursea House A2 65 percent; C 35 percent (Total 17 EVEs, 0.2 percent)
Size: 210 ± 14mm (n = 2)
Chronology: Bursea House: 1 stratified example in Period Dii
Example: Illus. 5.35 example from context 517

B08: straight sided bowl with embryonic flange

B08a Description: Straight sided bowl with embryonic flange
Production: Hasholme 35, 37
Bursea House A1 19 percent; A2 25 percent; C 55 percent (Total 47 EVEs, 0.5 percent)
Size: Bursea House: 250 ± 70mm (n = 2)
Hasholme: *c.* 330mm
Chronology: Bursea House: 1 stratified example in Period D
Example: Illus. 5.35 example from context 509

B08b Description: Straight sided bowl with embryonic flange
Production: Hasholme 36
Bursea House A2 50 percent; C 50 percent (Total 18 EVEs, 0.2 percent)
Size: -
Chronology: Bursea House: 1 stratified example in Period Di
Example: Illus. 5.35 example from context +

B09-B11 sided bowls with fully fledged flanges

These are straight sided bowls with flanges below the rim. They made up a large proportion of the output of the Throlam kilns, as they did at Crambeck. Here the group makes up 1.3 percent of the Bursea wheel-made material. At Crambeck such forms are generally considered to be later fourth century, however, such forms are known from as early as the first century (Corder 1930, 26). At Bursea the few stratified forms all appear in Period D.

B09a Description: Straight sided bowl with a flange below the lip
Production: Throlam 1, 2, 5, 6, 7, 8, 15, 16
Bursea House A2 27 percent; C 73 percent (Total 108 EVEs, 1.2 percent)
Size: Bursea House: 220 ± 0mm (n = 6)
Throlam: two sizes, *c.* 170-180mm and *c.* 250-270mm
Chronology: Bursea House: 3 stratified examples in Period D
Example: Illus. 5.35 example from context 505

B09b Description: Straight sided bowl with a flange below the lip
Production: Throlam 4, 11, 17, 18
Bursea House A1 100 percent (Total 6 EVEs, >0.1 percent)
Unidentified LW1 (Total 13 EVEs)
Size: Throlam: 270-310mm
Chronology: Bursea House: no stratified forms
Example: Illus. 5.35 example from context +

B10a Production: Throlam 10
Size: 290mm
Illus. 5.35 example from Throlam 10

B11a Production: Throlam 12, 13, 109
Size: *c.* 180mm and *c.* 250mm
Illus. 5.35 example from Throlam 12

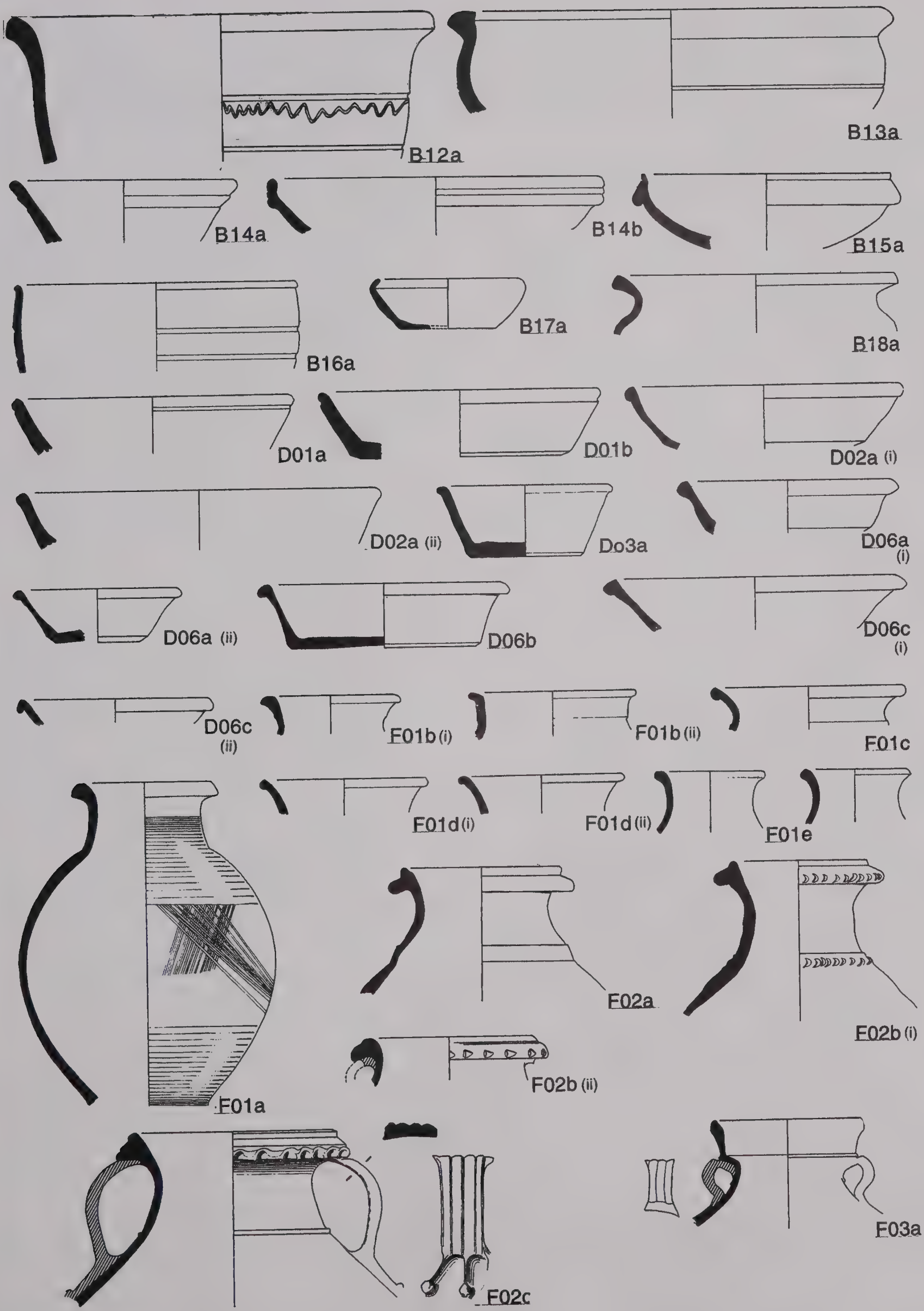
B11b Production: Throlam 9
Size: *c.* 280mm
Illus. 5.35 example from Throlam 9

B11c Description: Straight sided bowl with a flange below the lip
Production: Throlam 14
Size: *c.* 190mm
Chronology: -
Example: Illus. 5.35 example from Throlam 14

B12-18: miscellaneous bowl forms

B12a Description: Thickened rim, fairly straight sided bowl
Production: Throlam 32
Bursea House A2 100 percent (Total 12 EVEs, 0.1 percent)
Size: -
Chronology: Bursea House: 1 stratified example in Period Di
Example: Illus. 5.36 example from Throlam 32

B13a Description: Bowl variant of the J02a Dalesware-style rim, with an internal ledge
Production: Bursea House A2 100 percent (Total 24 EVEs, 0.3 percent)
Size: -
Chronology: Bursea House: 1 stratified example in Period Dii
Example: Illus. 5.36 example from context 245



Illus. 5.36 *Pottery typology forms B12a - F03a. Scale 1:4*

B14a	Description:	Straight sided bowl with three parallel bands
	Production:	Bursea House A2 20 percent; C 80 percent (Total 10 EVEs, 0.1 percent)
	Size:	-
	Chronology:	Bursea House: 1 stratified example in Period Dii
	Example:	Illus. 5.36 example from context 100
B14b	Description:	As B14a with the bands developing into a vertical collar
	Production:	Bursea House B 100 percent (Total 12 EVEs, 0.1 percent)
	Size:	-
	Chronology:	Bursea House: 1 stratified example in Period C
	Example:	Illus. 5.36 example from context 118
B15a	Description:	Hemispherical bowl, with a slight flange.
	Production:	Bursea House A1 100 percent (Total 15 EVEs, 0.2 percent)
	Size:	200mm (n = 1)
	Chronology:	Bursea House: 1 stratified example in Period Di
	Example:	Illus. 5.36 example from context 407
B16a	Description:	Possibly a Drag. 37-inspired form
	Production:	Bursea House A2 100 percent (10 EVEs, 0.1 percent)
	Size:	180mm (n = 1)
	Chronology:	Bursea House: 1 stratified example in Period D
	Example:	Illus. 5.36 example from context 505
B17a	Description:	Small simple bowl
	Production:	Bursea House A2 100 percent (44 EVEs, 0.5 percent)
	Size:	100 ± 0mm (n = 2)
	Chronology:	Bursea House: 2 stratified examples in Periods A and Di
	Example:	Illus. 5.36 example from context 544
B18a	Description:	Bowl form with some similarities to the lid seated jar form J05
	Production:	Unidentified LW5 (Total 15 EVEs, 0.2 percent)
	Size:	-
	Chronology:	Bursea House: 1 stratified example in Period Di
	Example:	Illus. 5.36 example from context 157

Dishes

D01-2	Large shallow dishes with plain rims	86 EVEs	1.0%
D03	Large shallow dishes with thickened rims	17 EVEs	0.2%
D06	Large shallow dishes with protruding rims	391 EVEs	4.3%
	Total Dishes	494 EVEs	5.5%

There are certain similarities between the bowls B06 and the dishes with protruding rims, hence they have been similarly called D06.

D01a	Description:	Large shallow dish
	Production:	Hasholme 33 Bursea House A2 81 percent; C 19 percent (Total 27 EVEs, 0.3 percent)
	Size:	Bursea House: 250 ± 24mm (n = 2) Hasholme: *c.* 160mm
	Chronology:	Bursea House: one stratified example in Period Di
	Example:	Illus. 5.36 example from context 407
D01b	Description:	-
	Production:	Hasholme 31 Bursea House B 39 percent; C 61 percent (Total 18 EVEs, 0.2 percent)
	Size:	Bursea House: 210 ± 14mm (n = 2) Hasholme: *c.* 260mm
	Chronology:	Bursea House: one stratified example in Period Di
	Example:	Illus. 5.36 example from context 402
D02a	Description:	-
	Production:	Throlam 110 Bursea House A2 17 percent; C 83 percent (Total 41 EVEs, 0.5 percent)
	Size:	Bursea House: 220 ± 34mm (n = 3)
	Chronology:	Bursea House: two stratified examples in Periods C and Dii
	Example:	Illus. 5.36 first example from context 310, second example context 402
D03a	Description:	Large shallow dishes with thickened rims
	Production:	Hasholme 32 Bursea House A2 100 percent (Total 17 EVEs, 0.2 percent)
	Size:	Hasholme *c.* 120mm
	Chronology:	Bursea House: one stratified examples in Period F
	Example:	Illus. 5.36 example from context +
D06a	Description:	Large shallow dishes with protruding rims
	Production:	Hasholme 29 Bursea House A1 12 percent; A2 47 percent; B 12 percent; C 29 percent (Total 121 EVEs, 1.3 percent)
	Size:	Bursea House: 198 ± 42mm (n = 10) Hasholme: *c.* 100mm
	Chronology:	Bursea House: eight stratified examples in Periods C to F (mainly in Di)
	Example:	Illus. 5.36 first example from context 403, second from context 416

D06b	Description:	Large shallow dishes with protruding rims
	Production:	Hasholme 30 Bursea House A1 13 percent; A2 31 percent; B 18 percent; C 38 percent (Total 191 EVEs, 2.1 percent)
	Size:	Bursea House: 207 ± 32mm (n = 13)
	Chronology:	Bursea House: 10 stratified examples in Periods C to Dii (mainly in Di)
	Example:	Illus. 5.36 example from context 493
D06c	Description:	Large shallow dishes with protruding rims
	Production:	Throlam 108 Bursea House: A1 24 percent; A2 19 percent; B 13 percent; C 44 percent (Total 79 EVEs, 0.9 percent)
	Size:	Bursea House: 173 ± 43mm (n = 7)
	Chronology:	Bursea House: seven stratified examples in Periods Di to F (mainly in Di)
	Example:	Illus. 5.36 first and second examples from context 413

Flagons

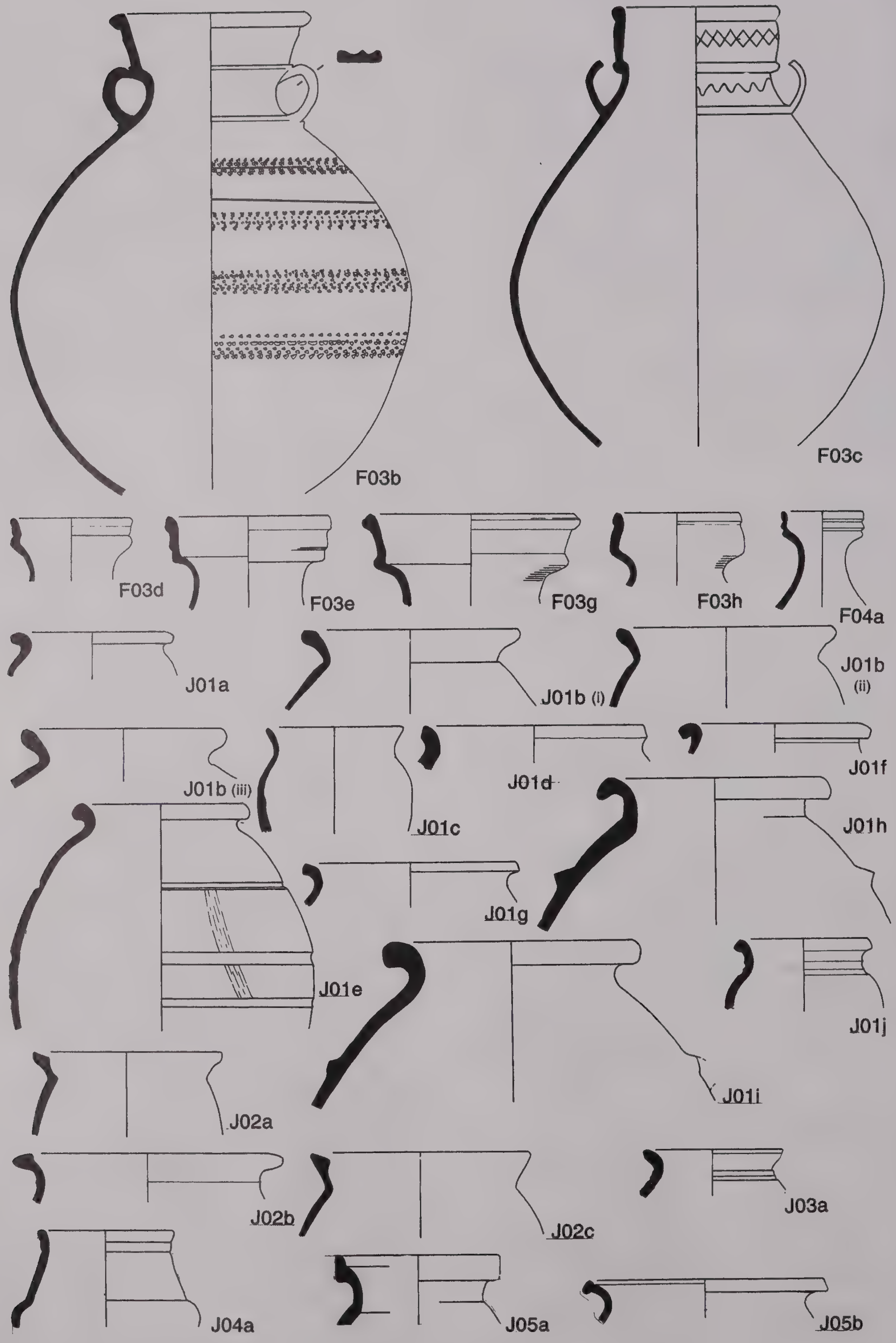
F01a	Description:	Narrow-neck jar
	Production:	Hasholme 18, 19, 20 Bursea House A2 100 percent (Total 13 EVEs, 0.1 percent)
	Size:	Hasholme: *c.* 210-230mm
	Chronology:	Bursea House: no stratified examples
	Example:	Illus. 5.36 example from Hashome 19
F01b	Description:	Narrow-neck jar
	Production:	Throlam 96 Bursea House A2 57 percent; B 43 percent (Total 23 EVEs, 0.3 percent)
	Size:	-
	Chronology:	Bursea House: two stratified examples in Periods C and Dii
	Example:	Illus. 5.36 first example from context 118, second from context 162
F01c	Description:	Narrow-neck jar
	Production:	Throlam 95 Bursea House A2 65 percent; B 35 percent (Total 20 EVEs, 0.2 percent)
	Size:	140mm (n = 1)
	Chronology:	Bursea House: two stratified examples in Periods Di and Dii
	Example:	Illus. 5.36 example from context 415
F01d	Description:	Narrow-neck jar
	Production:	Throlam 98 Bursea House A2 100 percent (Total 10 EVEs, 0.1 percent)
	Size:	-
	Chronology:	Bursea House: one stratified example in Period Di
	Example:	Illus. 5.36 first example from context 11, second from context 292
F01e	Description:	Narrow-neck jar
	Production:	Throlam 97 Bursea House A1 52 percent; A2 48 percent (Total 56 EVEs, 0.6 percent)
	Size:	Bursea House: 100mm (n = 1)
	Chronology:	Bursea House: three stratified examples in Periods B and C
	Example:	Illus. 5.36 first example from context 118, second from context 1

A broader range of flagon forms was found at Throlam and Hasholme than at Bursea House. Only one example of these further types was found at Bursea House.

F02a	Production:	Throlam 93 and 94 Illus. 5.36 Throlam 93
F02b	Production:	Throlam 91 and 92 Illus. 5.36 Throlam 91 and Throlam 92
F02c	Production:	Hasholme 21 Illus. 5.36 Hasholme 21
F03a	Production:	Throlam 70 Illus. 5.36 Throlam 70
F03b	Production:	Hasholme 16 Illus. 5.37 Hasholme 16
F03c	Description:	Narrow-neck jar
	Production:	Hasholme 17 Bursea House A1 17 percent; A2 57 percent; C 26 percent (Total 65 EVEs, 0.7 percent)
	Size:	170 ± 27mm (n = 5)
	Chronology:	Bursea House: 5 stratified examples in Periods D and Di
	Example:	Illus. 5.37 example from Hasholme 17
F03d	Production:	Throlam 68 Illus. 5.37 Throlam 68
F03e	Production:	Throlam 60, 63, 64, 65, 66 and 69 Illus. 5.37 Throlam 65
F03f	Production:	Throlam 57, 58, 59, 61 Illus. 5.37 Throlam 58
F03g	Production:	Throlam 62 Illus. 5.37 Throlam 62
F03h	Production:	Throlam 67 Illus. 5.37 Throlam 67
F04a	Production:	Throlam 71 Illus. 5.37 Throlam 71

Jars

J01	Large storage jars with loop handles	3700 EVEs	40.6 percent
J02	Dalesware derived forms	850 EVEs	9.3 percent
J05	Lid seated jars and variants	738 EVEs	8.1 percent
J06-9	Miscellaneous	182 EVEs	2.0 percent
Total Jars		5470 EVEs	60.0 percent



Illus. 5.37 Pottery typology forms F03b - J05b. Scale 1:4

J01

These vessels were extremely plentiful at Throlam. At Bursea House they made up 40.6 percent of the wheel-made output. The proportions may over-represent their actual production as the thinness of their sides must have led to a greater proportion of breakages. Similar vessels represented *c.* 9 percent of the Crambeck output, though there the handles were countersunk rather than applied with the loop of the handles being wholly outside the profile of the vessel.

J01a	Description:	Large storage jar with large loop handles
	Production:	Throlam 73, 74 Hasholme 9, 10 Bursea House A1 15 percent; A2 82 percent; B 3 percent; C 1 percent (Total 877 EVEs, 9.6 percent)
	Size:	Throlam: *c.* 90 and 160mm Hasholme: *c.* 140 and 200mm Bursea House: 166 ± 34mm (n = 31)
	Chronology:	Bursea House: 36 stratified examples in Periods C to F
	Example:	Illus. 5.37 example from context 140
J01b	Description:	Large storage jar with large loop handles
	Production:	Hasholme 6, 7, 8, 11 Bursea House A1 11 percent; A2 80 percent; B 2 percent; C 6 percent; D 1 percent (Total 1496 EVEs, 16.4 percent) Unidentified LW6 (Total 6 EVEs)
	Size:	Hasholme: *c.* 120, 160 and 300mm Bursea House: 149 ± 32mm (n = 52)
	Chronology:	Bursea House: 59 stratified examples in Periods A to F (mainly Di)
	Example:	Illus. 5.37 first example from context 439), second from context 404 and third from context +
J01c	Description:	Large storage jar with large loop handles
	Production:	Throlam 88 Bursea House A1 20 percent; A2 55 percent; B 19 percent; C 5 percent; D 1 percent (Total 671 EVEs, 7.3 percent)
	Size:	Throlam: *c.* 110mm Bursea House: 150 ± 49mm (n = 36)
	Chronology:	Bursea House: 31 stratified examples in Periods A to F (mainly Di)
	Example:	Illus. 5.37 example from context 411
J01d	Description:	Large storage jar with large loop handles
	Production:	Throlam 75, 76, 87 Bursea House A1 2 percent; A2 23 percent; B 69 percent; D 6 percent (Total 121 EVEs, 1.3 percent)
	Size:	Throlam: *c.* 120-160mm Bursea House: 148 ± 12mm (n = 6)
	Chronology:	Bursea House: 5 stratified examples in Periods Di and F
	Example:	Illus. 5.37 example from context 403
J01e	Description:	Large storage jar with large loop handles
	Production:	Throlam 77, 78, 79, 83, 89, 90 Bursea House A1 100 percent (Total 10 EVEs, 0.1 percent)
	Size:	Throlam: *c.* 110-160mm
	Chronology:	Bursea House: no stratified examples
	Example:	Illus. 5.37 example from Throlam 90
J01f	Description:	Large storage jar with large loop handles
	Production:	Throlam 80, 82 Bursea House A2 100 percent (Total 25 EVEs, 0.3 percent)
	Size:	Throlam: *c.* 140-150mm Bursea House: 280mm (n = 1)
	Chronology:	Bursea House: no stratified examples
	Example:	Illus. 5.37 example from context +
J01g	Description:	Large storage jar with large loop handles
	Production:	Throlam 72 Bursea House A2 88 percent; B 12 percent (Total 75 EVEs, 0.8 percent) Unidentified LW5 (Total 5 EVEs)
	Size:	Bursea House: 180 ± 28mm (n = 2) Throlam: *c.* 120mm
	Chronology:	Bursea House: 3 stratified examples in Period F
	Example:	Illus. 5.37 example from context 131
J01h	Description:	Large storage jar with large loop handles
	Production:	Throlam 84, 85 Bursea House A1 13 percent; A2 66 percent; B 20 percent (Total 250 EVEs, 2.7 percent) Unidentified LW6 (Total 3 EVEs)
	Size:	Throlam: *c.* 150mm Bursea House: 168 ± 40mm (n = 6)
	Chronology:	Bursea House: 9 stratified examples in Periods A to F (mainly D to F)
	Example:	Illus. 5.37 example from Throlam 84
J01i	Description:	Large storage jar with large loop handles
	Production:	Throlam 81 Bursea House A1 13 percent; A2

		87 percent (Total 131 EVEs, 1.4 percent)
	Size:	Throlam: *c.* 180mm Bursea House: 120mm (n = 2) and 215mm (n = 2)
	Chronology:	Bursea House: 3 stratified examples in Periods D and F
	Example:	Illus. 5.37 example from Throlam 81
J01j	Description:	Large storage jar with large loop handles
	Production:	Unidentified LW4 (Total 44 EVEs)
	Size:	Bursea House: 115 ± 07mm (n = 2)
	Chronology:	Bursea House: 2 stratified examples in Period A
	Example:	Illus. 5.37 example from context 533

J02: Dalesware related forms

These forms were thought to be derived from 'Dalesware', manufactured in North Lincolnshire (Gillam 1951; Loughlin 1977), and were therefore given a relatively late date, possibly being mid third to mid fourth century. However, work by Swan has suggested a revision of this may be in order. She considered the form to derive not from the indigenous Lincolnshire 'Dalesware' jars, but rather from jars with a triangular rim originating in Gallia Narbonensis, particularly the Languedoc (Swan 1992; 1993). After the arrival of Legio VI Victrix in York in the 120s Swan sees much of the York repertoire of ceramics being influenced by African and slightly later southern French forms. With the citation of a number of inscriptions to demonstrate legionary recruits derived from southern France she concludes that legionaries may have been transferred here by Severus after the defeat of Albinus in 197 or during his expedition here in the early third century.

An earlier date for these forms would also correlate with the fabric in which they occur. Mainly they are produced in Fabric B which is dominated by form J02 types. The fabric is known from later second-century contexts from Shiptonthorpe (Evans *pers. comm.*).

J02a	Description:	Dalesware related form
	Production:	Hasholme: 38, 39, 40 Bursea House: A1 3 percent; A2 12 percent; B 85 percent (Total 129 EVEs, 1.4 percent)
	Size:	Hasholme: *c.* 130 and 170mm Bursea House: 157 ± 27mm (n = 10)
	Chronology:	Bursea House: 7 stratified examples in Periods A to D
	Example:	Illus. 5.37 example from context 909
J02b	Description:	Dalesware related form
	Production:	Hasholme 41, 42 Bursea House: A2 100 percent (Total 38 EVEs, 0.4 percent)
	Size:	Bursea House: 140mm (n = 1)
	Chronology:	Bursea House: 2 stratified examples in Periods B and D
	Example:	Illus 5.37 example from context +
J02c	Description:	Dalesware related form
	Production:	Bursea House B 99 percent; C 1 percent (Total 683 EVEs, 7.5 percent)
	Size:	161 ± 23mm (n = 26)
	Chronology:	Bursea House: 46 stratified examples in Periods B to F (mainly Di)
	Example:	Illus. 5.37 example from context 272

Other Jars

J03a	Production:	Throlam 101 *c.* 70mm Illus. 5.37 Throlam 101
J03b	Production:	Throlam 102 *c.* 70mm Illus. 5.37 Throlam 102
J04a	Production:	Throlam 106 *c.* 70mm Illus. 5.37 Throlam 106

J05: lid seated jars and variants

All of these are normally taken to be early forms, and this is perhaps corroborated by their presence in Periods B and C.

J05a	Description:	Lid seated jar
	Production:	Bursea House A1 100 percent (Total 10 EVEs, 0.1 percent)
	Size:	-
	Chronology:	Bursea House: 1 stratified example in Period Di
	Example:	Illus. 5.37 example from context 106
J05b	Description:	As J05a with a more curved rim
	Production:	Bursea House: A2 8 percent; B 92 percent (Total 475 EVEs, 5.2 percent)
	Size:	Bursea House: 156 ± 22mm (n = 14)
	Chronology:	Bursea House: 24 stratified examples in Periods B to F (mainly D)
	Example:	Illus. 5.37 example from context 413
J05c	Description:	As J05b though the lid seating has become more imperceptible
	Production:	Bursea House: A2 4 percent; B 96 percent (Total 246 EVEs, 2.7 percent)
	Size:	Bursea House: 163 ± 34mm (n = 9)
	Chronology:	Bursea House: 11 stratified examples in Periods C to F (mainly D)
	Example:	Illus. 5.38 example from context 2
J05d	Description:	As J05a, but without the internal lid seating
	Production:	Bursea House: B 100 percent (Total 7 EVEs)
	Size:	-
	Chronology:	-
	Example:	Illus. 5.38 example from context +

J06-9: Miscellaneous Jars

J06a	Description:	Plain S-bend form with no rim
	Production:	Bursea House: A2 50 percent; B 50 percent (Total 20 EVEs, 0.2 percent)
	Size:	Bursea House: 200mm (n = 1)
	Chronology:	Bursea House: no stratified examples
	Example:	Illus. 5.38 example from context 118
J07a	Description:	Small rounded rim edge
	Production:	Bursea House: A1 26 percent; A2 74 percent (Total 62 EVEs, 0.7 percent)
	Size:	Bursea House: 214 ± 62mm (n = 5)
	Chronology:	Bursea House: 5 stratified examples in Periods A to D
	Example:	Illus. 5.38 example from context 544
J09a	Description:	
	Production:	Bursea House: B 100 percent (Total 100 EVEs, 1.1 percent)
	Size:	Bursea House: 130 ± 0mm (n = 5)
	Chronology:	Bursea House: 5 stratified examples in Period D
	Example:	Illus. 5.38 example from context 647

Inkwell

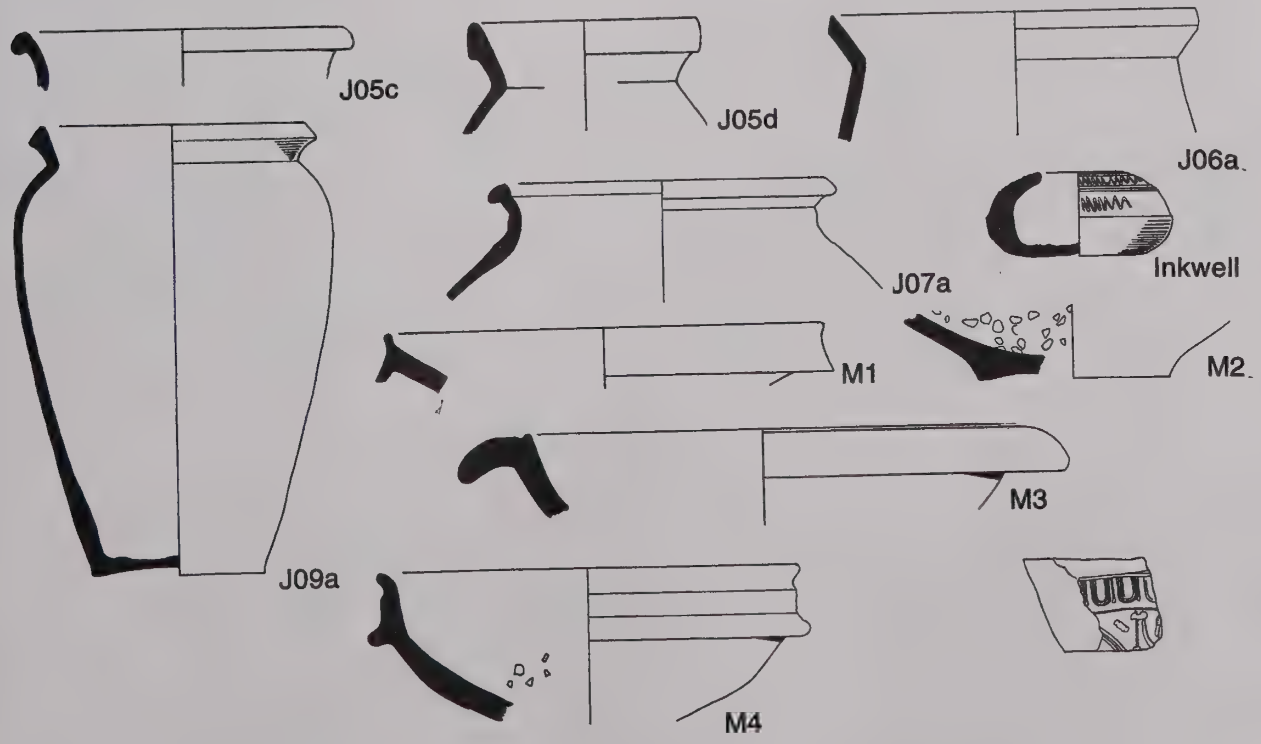
Description:	Inkwell
Production:	Bursea House: A1 100 percent (Total 50 EVEs, 0.5 percent)
Chronology:	Bursea House: no stratified examples
Example:	Illus. 5.38 example from context 501

Mortaria

M1	Production:	Bursea House: A1, 5 EVEs
	Chronology:	Bursea House: no stratified examples
	Example:	Illus. 5.38 example from context +
M2	Production:	Bursea House: A2, 5 EVEs
	Chronology:	Bursea House: one stratified example in Period A
	Example:	Illus. 5.38 example from context 270
M3	Production:	Unidentified LW1, 13+5 (24 EVEs) EVEs
	Chronology:	Bursea House: two stratified examples from the same vessel in Periods Di and F Northern production, probably mid second-century
	Example:	Illus. 5.38 example from context 258
M4	Production:	Unidentified LW2, 9 EVEs
	Chronology:	Bursea House: one stratified example in Period Dii Local production, possibly second-century
	Example:	Illus. 5.38 example from context 245

Broad trends

The relative proportions of each vessel form (Table 5.12) show the usual rise in production of bowls at the expense of jars (cf. Millett 1979).



Illus. 5.38 *Pottery typology forms J05c - Inkwell plus mortaria and decorated samian. Scale 1:4*

5.6.2 The local hand-made wares: LH1-LH10

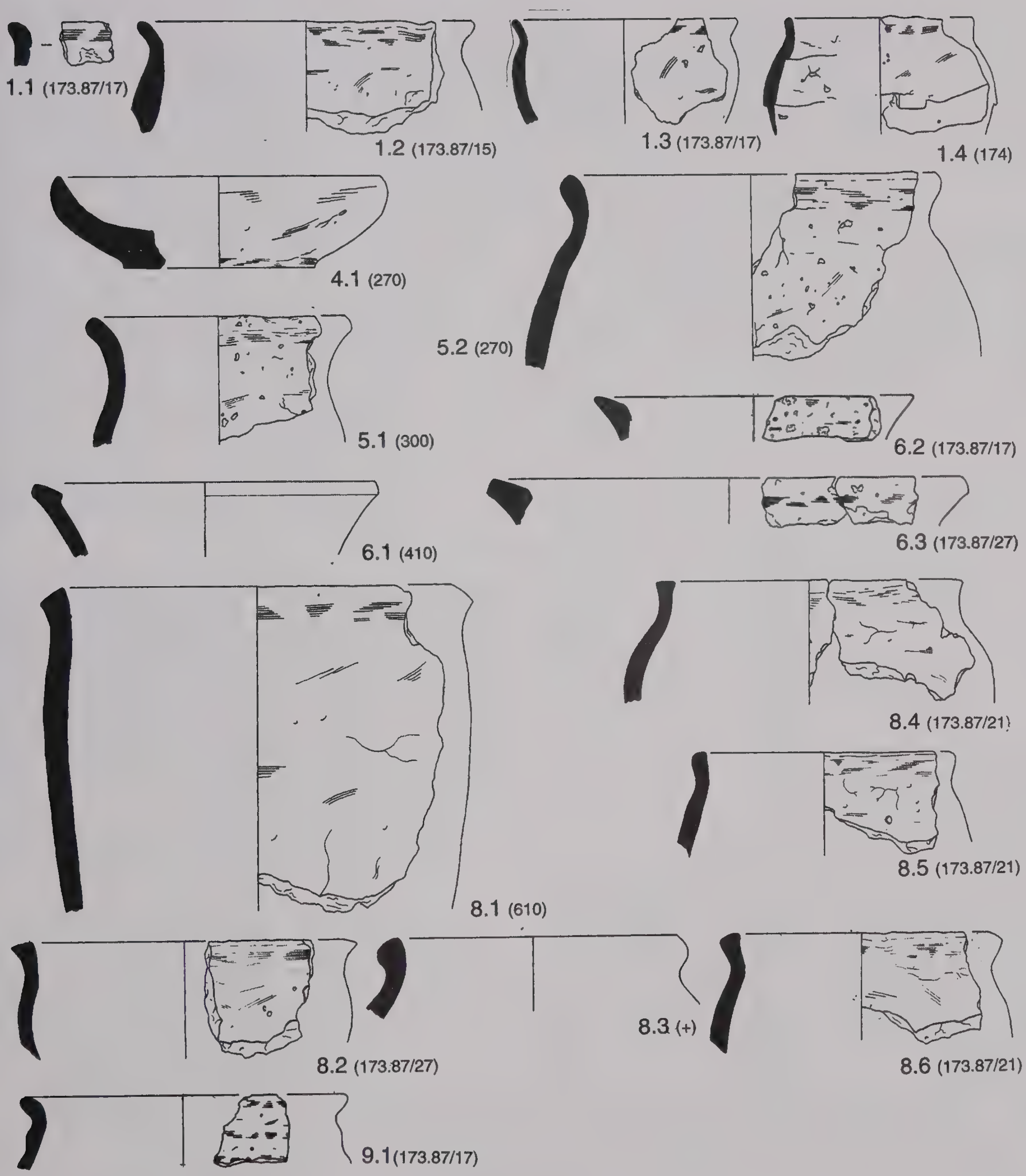
Ten hand-made fabrics were identified. Seven of them from the 1983-84 excavations, and three additional ones (LH7, 8 and 10) from the 1987 trench by Peter Halkon [accession number KINCM 173.1987]. The fabrics are first discussed (Table 5.13), then the range of forms (Illus. 5.39).

LH1-2	Fabric description:	Hand-made reduced, black core and margins, buff exterior; abundant angular voids *c.* 0.5-3.0mm from leached out calcite tempering. LH2 is distinguished by containing some rounded red-brown iron stone inclusions 1.0-2.0mm in addition. [Hawling Road Fabric G01]
	Chronology:	Possibly Iron Age - late second-century A.D., judging by its similarity to fabric G01 at Hawling Road. There it made up 65-85 percent of some Iron Age contexts, falling to 10-30 percent of second-century deposits. This would fit in with its presence from Period A onwards. However, the fabric is not that much different from late Roman calcite gritted wares, so the terminal date is problematic. The greater presence of LH1 in Periods Eii-F may indicate that this fabric does indeed carry on right through the Roman period.
LH3	Fabric description:	Reduced, hand-made, dark brown-grey core margins and surface; abundant quartz *c.* 0.5-1.0mm; some rounded brown-black ironstone 1.0-3.0mm. [Hawling Road Fabric G25]
	Chronology:	Locally produced, probably first-second century. Like G01, this was found in the earliest contexts at Hawling Road, probably of the early first century A.D. where it accounted for 4-8 percent of deposits. It continued strongly into the second century representing often 20-40 percent of the assemblages.
LH4	Fabric description:	Hand-made reduced fabric, dark grey core margins and surfaces; common moderate sand temper *c.* 0.3mm; some sandstone inclusions *c.* 1.0-2.0mm. Iron Age or Early Roman? [Hawling Road Fabric G07]
	Chronology:	This fabric does not appear on site until Period C. The late appearance is probably illusory. As with LH1-3, all appear in late Pre Roman Iron Age contexts at Hawling Road. LH4 made up a small but continued presence of 1-5 percent from the first to second century.
LH5	Fabric description:	Hand-made, dark grey core and margins, oxidized exterior; common red and black ironstone (?) *c.* 0.5-2.0mm. [Hawling Road Fabric G294]
	Chronology:	This is found in small quantities in first to second century contexts at Hawling Road. Where it is found it makes up 1-2 percent of the assemblage. At Bursea House it is found principally in Period A and levels thereafter.
LH6	Fabric description:	Reduced hand-made fabric, black core, buff margins and surface; some fine sand temper *c.* 0.1mm; common large vegetable temper voids up to 7.0mm in length; some large sub-rounded grog up to 3.0mm.
	Chronology:	This was found in very limited quantities only in Periods C and Dii.
	Forms:	Only body sherds were recovered in the stratified excavations. Three rims however came from the 1987 excavation, context 17.
LH7	Fabric description:	Hand-made, black core and margins, grey surfaces, common subangular translucent quartz *c.* 0.5-2.0mm. [Hawling Road Fabric G25]

Table 5.12

Bursea House. The relative proportion (percent) of different forms amongst the kiln products (Fabrics A–D)

	Period A	Period B	Period C	Period D	Period Di	Period Dii	Period E	unstratified
Bowls	32.7	9.2	16.7	30.6	25.1	47.1	47.5	36.9
Dishes	0	0	7.6	1.3	10.1	7.8	2.9	3.6
Flagons	0	12.6	3.7	0	0.8	5.2	0	1.4
Jars	57.7	78.2	72	68.1	64.0	39.9	49.6	58
Mortaria	9.6	0	0	0	0	0	0	0.2
Inkwells	0	0	0	0	0	0	0	1.5
Total (g)	156	87	965	708	2237	592	926	3329



Illus. 5.39 *Bursea House. Hand-made pottery forms. Scale 1:4*

	Chronology:	Probably Iron Age 'Belgic'-influenced piece. Only a small fragment of this was found at Hawling Road (context 4031) where it made up 0.3 percent of a hand-made assemblage.
LH8	Fabric description:	Hand-made reduced fabric, dark grey core, margins and surfaces; common sub-angular white quartzite temper *c.* 1.0-3.0mm; Some vegetable impressions on exterior base only.
	Chronology:	Probably Iron Age to second-century
LH9	Fabric description:	Common to moderate sand temper; common fine sand 0.2-0.3mm; black core, orange margins and surfaces, hand-made. May or may not be from a vessel.

Table 5.13

Bursea House. The relative proportions of the hand-made fabrics from the 1983-84 excavations (by weight)

	LH1	LH2	LH3	LH4	LH5	LH6	LH9	Total
Period A	5430	240	15	0	1460	0	10	7155g
Period B	0	0	2	0	26	0	0	28g
Period C	439	247	86	133	123	220	0	1248g
Period D	720	0	10	0	0	0	10	740g
Period Di	439	494	20	26	161	0	0	1140g
Period Dii	10	0	75	20	0	60	0	165g
Period Eii	3200	0	0	0	0	0	0	3200g
Period F	635	249	25	47	154	0	9	1119g
Unstratified	927	371	168	85	0	0	5	1556g
Total	11800	1601	401	311	1924	280	34	16351g
Percentage	72.1	9.8	2.5	1.9	11.8	1.7	0.2	

	Chronology:	This was found in very limited quantities from Period A onwards.
LH10	Fabric description:	Hand-made reduced fabric, dark grey core, buff margins, dark grey surfaces; abundant brown to grey sub-rounded grog inclusions *c.* 0.5-3.0mm; some/common angular voids from leached out calcite tempering *c.* 1.0-3.0mm.
	Chronology:	Probably Iron Age to second-century

Discussion of hand-made fabrics

The proportion of hand-made fabrics from phase to phase varies quite substantially. However, no systematic trends occur within that variation (Table 5.13). The overall proportions are similar to those from the first century A.D. deposits at Hawling Road, with LH1 dominating. However, there most of the fabrics continued in use through into the second century.

Continued production of these fabrics into the first millennium A.D. is also supported by two thermoluminescence dates from sherds of loacl hand-made pottery. A TL survey date on a sherd from context 272 at Bursea House (Phase Di) provided an age of A.D. 110±375 (Dur84TL 11-2AS) whilst that previously published from the Hasholme logboat (Millett and McGrail 1987, 78-79) was A.D. 190±270 (Dur85TL 44-1AS). Both dates are expressed at the 68 percent confidence level.

In Table 5.10 these hand-made fabrics can be seen to represent the vast majority of material in Period A. Even so, the traditional dating of the grey-wares associated with these fabrics suggests either that the hand-made wares are residual or else that there was a great deal of conservatism in fabrics into the late second or third century when the main sequence starts.

Hand-made forms

The forms were fairly variable, and have been divided into a number of broad goups (1-9). The most consistent forms were jars with rims similar to those amongst the wheel-made 'Dalesware' (J2c) (Group 6); the thickened rim jars (Group 8) and one rim similar to vessels from Dragonby (Group 9). Examples of distinctive forms are shown in Illus. 5.39 and a summary of the phases the forms were found in is provided in Table 5.14.

1. Bowls with wide mouths

LH1/2	127 EVEs	Present in Periods A, C (Illus. 5.39 no. 1.4), D, Di and F (Illus. 5.39 no. 1.2)
LH3	6 EVEs	Present in Period F
LH4	23 EVEs	Present in an unstratified context and Period Dii
LH5	8 EVEs	Present in Period A
LH6	5 EVEs	Present in 1987 excavations (Illus. 5.39 no. 1.1)
LH6	5 EVEs	Present in 1987 excavations (Illus. 5.39 no. 1.3)
LH7	21 EVEs	Present in 1987 excavations

2. Straight sided bowls

LH1/2	9 EVEs	Present in Period F

3. Large shallow dishes with plain rims

LH1/2	12 EVEs	Present in Period F

4. Large shallow dishes with thickened rims

LH1/2	8 EVEs	Present in Period A (Illus. 5.39 no. 4.1)

5. Large storage jars

LH1/2	178 EVEs	Present in unstratified contexts and Periods A, C (Illus. 5.39 no. 5.1), D and F
LH3	13 EVEs	Present in unstratified contexts
LH4	39 EVEs	Present in Periods C, Di and F
LH5	32 EVEs	Present in Period A (Illus. 5.39 no. 5.2)

. Dalesware forms

LH1/2	24 EVEs	Present in 1987 excavations and Periods Di (Illus. 5.39 no. 6.1) and F
LH8	9 EVEs	Present in 1987 excavations (Illus. 5.39 no. 6.2, 6.3)
LH10	10 EVEs	Present in 1987 excavations

7. Jar with small rounded rim edge

LH3	5 EVEs	Present in Period F

8. Thickened rim jar

LH1/2	54 EVEs	Present in Periods A (Illus. 5.39 no. 8.1) and D (Illus. 5.39 no. 8.3)
LH5	33 EVEs	Present in 1987 excavations (Illus. 5.39 no. 8.2)
LH10	65 EVEs	Present in 1987 excavations (Illus. 5.39 no. 8.4-8.6)

9. Dragonby related form

LH7	55 EVEs	Present in 1987 excavations (Illus. 5.39 no. 9.1)

5.6.3 Other ceramics present and the chronology of the sequence

Samian

Four fragments of samian were found:

Period	Context	Description
Di	114	3 abraded fragments East Gaulish Drag. 37, late second-early third-century
Di/ii	647	Decorated samian, Drag. 37, Lezoux (Illus. 5.38)

Amphora

Fragments of only one amphora were found during the excavations:

Pélichet 47	Amphora sherds, Buff core margins and surfaces, fairly soft fabric, some fine sand 0.1mm. Pelichet 47/Gauloise 4, Gallia Narbonensis, mid first to third-century (Peacock and Williams 1986, class 27).

Period	*Fragments*	*Weight*
Period Dii	1	10g
Period F	16 (7EVEs)	127g
Unstratified	2	13g
Total	19 (7EVEs)	150g

Crambeck parchment ware

Six fragments were found during the 1982-83 excavation, which were supplemented by the 1987 excavations. Fragments of Crambeck parchment ware were similarly found during the Throlam and Hasholme Hall excavations. The Crambeck parchment ware typology comes from Corder and Birley (1937), whilst Evans (1989) discusses the latest views on dating. Type 6 is early to mid fourth-century, whilst Types 5b and 7 are later fourth-century.
[Hawling Road Fabric F70]

Period Eii:	One 'Hammerhead' mortarium rim (Type 6 variant), 9 EVEs, 46g
Period F:	One hemispherical flanged bowl rim (Type 5b), 9 EVEs, 25g Three body sherds, 28g
Unstratified:	One flanged bowl rim (Type 7 variant), 8 EVEs, 20g
1987 excavations:	One 'Hammerhead' mortarium (Type 6 variant), 8 EVEs, 20g One small painted 'wallsided' mortarium, with external groove. Orange-red three to four line zig-zag decoration (Evans style E002) on the flange. (Type 7), 9 EVEs, 30g

Other non-local fabrics

X1

Fabric description:	Blue-grey core, orange brown margins, darkish grey surfaces; common sub-rounded quartzite inclusions white and grey *c.* 0.5-2.0mm; some sub-rounded black inclusions *c.* 0.5-2.0mm; a poorly finished fabric, occasional vegetable voids on exterior

Table 5.14

Bursea House. Summary of the phasing of the hand-made forms

Category	Period A	Period B	Period C	Period D	Period E	1987 trench A1
1. Bowls with wide mouths	x	-	x	x	x	x
2. Straight sided bowls	-	-	-	-	x	-
3. Large shallow dishes (plain rims)	-	-	-	-	x	-
4. Large shallow dishes (thickened rims)	x	-	-	-	-	-
5. Large storage jars	x	-	x	x	x	-
6. Dalesware forms	-	-	-	x	x	x
7. Jar with small rounded rim edge	-	-	-	-	x	-
8. Thickened rim jar	x	-	-	x	-	x
9. Dragonby-related form	-	-	-	-	-	x

surface, base shows string-marks. [Hawling Road Fabric G102]

Chronology: Similar to fabric G102 from Hawling Road, which was found there in context 4007 associated with a high proportion of early hand-made wares, probably early second-century. The forms found in the fabric are comparable to those from the Holme-on-Spalding Moor industries and the same typology has therefore been applied to them. A source for this fabric could not be identified.

Forms:

	Number	Weight (g)	EVEs and Forms
Period A	3	25	None
Period B	1	10	None
Period C	8	58	4 EVEs Form B07a
Period D	27	650	None
Period Di	42	619	20 EVEs Form J01c 15 EVEs Form J01b
Period Dii	15	272	8 EVEs Form J01c 12 EVEs Form J01b 11 EVEs Form J01c 11 EVEs Form D6b
Period Ei	1	77	None
Period F	4	42	None
Unstratified	26	535	None

5.6.4 Chronological conclusions and discussion

The Bursea House chronology

The Holme-on-Spalding Moor typology now needs to be anchored to some form of absolute chronology. This is not easy, as with many kiln excavations the absence of externally dated imported material does not help. At Throlam, apart from one fragment of samian (Drag. 31), the only other material (Crambeck parchment ware and calcite gritted ware) probably belonged to the fourth century, with an emphasis on the earlier part of the century, though certainly continuing later (Corder 1930, fig. 9). The Throlam output, along with the rest of the industry has generally been considered later third to fourth century, with the flanged bowls (B08-B11) particularly representing later fourth-century production. At Hasholme Hall some samian was again found, although the details are imprecise.

The range of imported material at Bursea was not very different. A few fragments of samian ware, the Pélichet amphora fragments from the second/third century, and some fragments of Crambeck ware representing fourth-century imports. Each period will be considered in turn examining the new forms and imports appearing in each to assess the date:

Period A: *terminus post quem* early third century?
The hand-made fabrics clearly dominated Period A contexts, making up over 80 percent of the pottery by weight (Table 5.10). The majority was a calcite gritted ware (LH1-2; Table 5.13) which was found in first- and second-century contexts at Hawling Road, although later dated contexts were lacking on that site and the fabric is rather too similar to later Roman calcite gritted wares to give it any chronological certitude. The story is the same with most of the other hand-made fabrics.

More secure dating evidence came from both the local (but unprovenanced) wheel-made fabric (LW4), again known from Hawling Road in the first to second-century contexts, but not the third to fourth-century field-walking material, and the unknown fabric (X1) which was again found in an early second-century context there.

This material is collectively suggestive of first- or second-century occupation in the area, however, the presence of 1148g of local greywares, mainly kiln products, and the associated forms, suggests a later deposition date for these particular contexts. The presence of J02a forms, related to the 'Dalesware' types, would normally suggest a date from the mid third century, but even if Swan is right (see discussion above) this would only push back the date to the early third century. This is earlier than the industry has normally been assumed to start. Nonetheless, with these forms present an earlier date would be 'uncomfortable'.

Period B: *terminus post quem* early third century + ?
The quantity of material in this period was small, but made up a significant proportion were better developed variants of the 'Dalesware' forms (J02b and J02c). Again this makes a date earlier than the third century unlikely. The developed 'Dalesware' form of J02c may suggest a chronologically later date than the assemblage in Period A, but the sample size is very small. Again a date in the early third century has been suggested based on Swan's discussion of the Dalesware forms (see above). However, the major transformation from Periods A to B is the significant shift in the proportions of hand-made fabrics which reduce to less than 20 percent for most of the subsequent periods.

Period C: *terminus post quem* early third century + ?
New to this period were two more local wheel-made fabrics (LW3 and LW6). They are known from first to second-century contexts at Hawling Road (remembering that later contexts are lacking), so their presence adds little to the chronological discussion.

Period Di/Dii: *terminus post quem* late third-early fourth century?
In period Di a few fragments of samian occurred, offering a late second to early third century *terminus post quem*. A mortarium fragment (M3) also suggested a date later than the mid second century. Amongst the kiln products the range of forms continued to expand, with flanged bowls appearing (B08-B11). These have generally been taken to be a phenomenon of the later third century onwards. In period Dii the fragments of a further second-century mortarium were found (M4) and the Pélichet 47 amphora dating to the mid first-third century. So a late third-century, going on into the fourth-century date is suggested for these phases.

Period Ei: *terminus post quem* late third - early fourth century?
There were no specific new markers in period Ei, so period Dii provides its *terminus post quem*. However it should be

Table 5.15

The chronology of forms at Bursea, Throlam and Hasholme (X = presence)

Form	Bursea					Throlam	Hasholme
	Period A	Period B	Period C	Period D	Periods E-F	Unstratified	Unstratified
B03a	14	-	-	65	-		X
B06a	12	-	27	192	71		X
B06b	5	-	-	119	28		
B17a	20	-	-	24	-		
D06b	41	3	41	119	-		X
J01b	45	30	187	536	68		X
J01c	13	-	217	169	13	X	
J01h	6	-	-	91	37	X	
J01j	44	-	-	-	-		
J02a	11	-	18	46	-		X
J07a	15	-	-	35	-		
B01k		8	23	8	33		
F01e		11	26	-	-	X	
J02b		13	-	25	-		X
J02c		7	60	401	59		
J05b		15	28	218	32		
B01a			47	139	162	X	X
B02b			11	20	14	X	
B06c			7	43	-		
B07a			22	-	-		X
B14b			12	-	-		
D02a			22	7	-	X	
D06a			10	76	11		X
F01b			10	13	-	X	
J01a			145	331	117	X	X
J05c			10	122	31		
B01b				65	51		X
B01d				3	-	X	
B01g				20	-	X	X
B01m				7	-		
B02a				38	-	X	X
B02c				10	-	X	
B02d				49	-	X	
B02f				6	16	X	
B06d				5	10		
B07a				11	-		
B08a				12	-		X
B08b				9	-		X
B09a				28	-	X	
B12a				12	-	X	
B13a				13	-		
B14a				8	-		
B14c				65	-		
B15a				15	-		
B16a				10	-		
B18a				15	-		
D01a				5	-		X
D01b				7	-		X
D06c				60	4	X	
F01c				20	-	X	
F01d				10	-	X	
J01d				20	28	X	
J01i				35	22	X	
J05a				10	-		
B01c					11	X	
B01l					5		
B02e					31	X	
D03a					12		X
J01g					41	X	

Table 5.16

The range of Bursea House kiln output

Period	Date	No. of forms	Weight of material (fabric A-D)
A	early third century?	11	1,373g
B	early 3rd century? +	7	471g
C	early 3rd century? +	19	6,783g
Di/ii	late 3rd / early 4th century?	50	34,484g
E/F	early–late 4th century?	24	8,479g

noted that from periods D to E the range of forms present was about halved.

Period Eii: *terminus post quem* early-mid fourth century
In this period were fragments of Crambeck Type 6 dating to the early-mid fourth century.

Period F: *terminus post quem* late fourth century
Whilst there was residual material, including additional Pélichet 47 fragments and second-century mortarium sherds (M3) there were a few fragments of Crambeck parchment ware (Type 5b and 7) dated by Evans to the late fourth century.

Discussion

Several points are worth noting. First the reliability of the chronology suggested above; secondly the variation in output of the Bursea kilns, and finally the Bursea kilns in comparison to the rest of the Holme-on-Spalding Moor industry.

The industry has usually been seen as starting in the later third century, however, as has been noted, there is a substantial presence of hand-made wares and the occasional import which may date to the first and second century. The start date of this sequence is problematic and relies upon the dating of the 'Dalesware' type forms. An early third-century date has been accepted here, but that is not universally agreed and some would date the form later. If an early third-century date is accepted, its association with a large amount of potentially second-century material does not seem as problematic as a gap of a century would do.

If this chronology is accepted, can we see any changes in the nature of the output of the Bursea kilns over the third and fourth centuries? One of the most surprising features is the extreme uniformity over time of the proportions of the different fabrics A-D (Table 5.10). The change is hardly significant at all and yet within this uniformity the range and number of forms represented changes (Table 5.15), so the pattern cannot be explained away entirely by a large degree of residuality. The largest quantity of pottery came from Period Di/ii. Since there were two kilns in the immediate vicinity from these phases this is hardly surprising, and cannot be used for suggesting a particular peak in output. However the fact that the range of the forms was also largest in these periods might suggest large scale production (though this may simply be a function of the enlarged sample size from this period).

Finally, how did the output at Bursea relate to those from the other kilns in the area? Table 5.17 gives a summary of the main differences between Bursea and the excavations at Throlam and Hasholme Hall. As can be seen there are significant differences. The other two kiln sites produced large numbers of straight sided bowls with flanges below the rim, but these only represented a small proportion of the Bursea output. These are largely considered to be later third- and fourth-century forms, a time when Bursea was certainly active. It seems that some of the differences at least do not relate to chronological shifts in forms, but in some degree of specialization within the numerous kilns which made up the Holme-on-Spalding Moor industry.

Table 5.17

A comparison of the output at Throlam, Hasholme and Bursea

Description	Typology	Throlam	Hasholme Hall	Bursea House
Deep wide-mouthed bowls	B01	Numerous (20-41)	Common	12.3 percent
Smaller bowls with wide mouths, and comparatively small moulded bases, often perforated for use as colanders.	B02	Numerous (42-56)	Rare	3.2 percent
Straight-sided bowls without developed flanges	B06-08	None recorded	Present	10.7 percent
Straight-sided bowls with a flange below the lip	B09-11	Numerous (1-19)	Common	1.2 percent
Large storage jars with loop handles	J01	Numerous (72-88)	Present, but in lesser quantities	40.6 percent
Large jars with moulded rims and two small handles at the neck	Not included	Numerous (57-70)	Present, but in lesser quantities	None
Dalesware Style Jars	J02		Present	9.3 percent

CHAPTER 6

INDUSTRIAL SITES 3: GLASS PRODUCTION

6.1 Introduction

Glass slag was first discovered during field-walking at Bursea House (Halkon 1983, 19). More was uncovered in the garden of the house by Mr Alan Johnson at SE 81303368. During the 1983 excavation some blue glass waste, similar to the bangles from the site (above Section 5.4.3) was found although all unstratified. Further pieces were also recovered in 1984. A preliminary examination of the material by Julian Henderson suggested that it represented different phases in glass manufacture and it was suggested that glass production might be associated with the pottery and iron manufacture in the area (Millett and Halkon 1988, 44). In view of the uncertainty about this material Dr Henderson was invited to undertake a more detailed study of the pieces.

6.2 The debris from a glass-making industry

by Julian Henderson

The various types of glassy artefacts discovered at Bursea House (above Chapter 5.3) probably result from the manufacture of glass, including the fusion of primary glass raw materials (sand, an alkali and a lime-rich material). To find such artefacts is unusual on an archaeological site in Britain (Henderson 1989, 44-47; Jackson *et al.* 1990); when debris from glass-working or glass-making is found in Britain it is often ephemeral and difficult to interpret. Recent excavations of an early Islamic glass workshop in Syria has produced some of the first excavated evidence for the fusion of glass raw materials (Henderson 1996).

Because the evidence from Bursea House is unusual it is particularly critical to examine closely the nature of the archaeological contexts in which it was found. In view of evidence for the other industrial activities at Bursea House, including evidence for iron smelting of unquestionable Roman date, evidence for Roman glass manufacture would be of great interest in a national context. A previous analytical study of a fragment of Romano-British glass armlet from Hasholme nearby has been published elsewhere (Henderson 1983). Iron Age iron smelting has been found at nearby Welham Bridge (above Chapter 4.2).

None of the evidence for the glass industry was derived from unquestioned Roman contexts (see Table 6.1), so it is necessary to find an objective means of suggesting whether the glass technology fits into the established Roman picture. An essential and objective means of doing this is by chemical analysis.

Samples taken

Samples for chemical analysis were removed from representative coloured lumps of material from the site, there being no recognizable fragments of glass artefacts. Thus, translucent green, 'opal' green (with a brownish tint), translucent dark green, translucent cobalt blue and an apparently opaque white glass (caused by turbidity and small bubbles in translucent glass) were analysed. Fragments of sintered glass (lumps of vitreous material composed of different colours - 'opaque' white, translucent blue and translucent green) and a fragment bearing a layer of vitreous scum were analysed (see Table 6.1).

Analytical technique

The technique used was electron-probe microanalysis. Samples as described above of about 0.5mm is size were removed from the artefacts, mounted in epoxy resin and polished down using a series of increasingly fine grades of powders, finishing with 0.5μm diamond paste. The electron probe was operated at 15k.V. and 20n.A. and a defocused electron beam of *c.* 80μm was used to avoid light elements from boiling off. Under these conditions it was possible to

Table 6.1

Bursea House: description of glass manufacturing waste

1	Rounded lump of translucent 'bottle' green glass, one side is covered with a criss-cross pattern of glass strands fused to the surface. Length = 33.2 mm; width = 28.5 mm; depth = 12.2 mm Context unstratified. Grid reference 115N, 195E
2	Lump of sintered translucent blue, dark green and 'opaque white' glass. Length = 21 mm; width = 22 mm Context unstratified.
3	Lump of opal green waste slag. Length = 42 mm; width = 49.5 mm Context 5 (unstratified).
4	Lump of irregular translucent cobalt blue glass. Length = 19.7 mm; width = 10.7 mm Context 402, small find no. 22. (unstratified).
5	Squarish lump of translucent blue glass with a layer of blue 'scum' attached to one surface. Length 45.3 mm; width = 39.2 mm; depth = 25.3 mm Context unstratified.
6	Lump of opal dark green vitreous slag. Length = 26.2 mm; width = 24 mm, depth = 08.7 mm. Context 40/401 (unstratified).
7	Lump of sintered translucent blue and 'opaque white' glass. Length = 48.7 mm; width =28.9 mm Context unstratified.

analyse each sample three times and the results given in Table 6.2 are an average of three analyses. Full details of analytical conditions are given elsewhere (Henderson 1988).

Results

The chemical compositions of the Bursea House glass (Table 6.2) are of interest from several points of view. All the fragments analysed, whether fully formed glass, froth from the surface of the melt, or sintered glass are characterized by a low total alkali (soda [Na_2O] + potassium oxide [K_2O]), high magesium oxide [MgO] and high calcium oxide [CaO] levels. These three compositional characteristics alone signal that we are dealing with very unusual glass compositions if we are suggesting that they are of a first millennium A.D. date. Indeed, because none of the fragments tested can be related to published (or unpublished) chemical compositions of dated Roman glass artefacts, it seems unlikely that the Bursea House glass is Roman. A later date for it thus seems most likely.

Other features of the compositions are: highly variable aluminium oxide ($A1_2O_3$) and silica (SiO_2) levels, negligible potassium oxide levels and, apart from analysis 4, a low but significant level of arsenious oxide (As_2O_3). Oxides which contribute to the colour of the samples (apart from the oxides already mentioned) are ferric oxide (Fe_2O_3), cobalt oxide (CoO) and, in sample 5, a trace of cupric oxide (CuO). Arsenious oxide (As_2O_3) may also effect the hue of the glass; the latter is often found in nineteenth-century and later glass.

Technological interpretation

Most Roman age glass analysed to date falls into a well-defined compositional category - soda-lime-silica - further characterized by low magnesnia and potassium oxides (LMG). The typical major and minor oxide levels found in Roman glass of the first four centuries A.D. in Europe are: *c.* 18 percent Na_2O, *c.* 0.5 percent MgO, *c.* 2.5 percent $A1_2O_3$, *c.* 65-70 percent SiO_2 and *c.* 0.5 percent K_2O. In most Roman translucent green glasses manganese oxide is often present at levels of *c.* 0.5-1.0 percent (Jackson *et al.* 1990; Caley 1962; Velde and Gendron 1980; Henderson 1996); amongst the vitreous material analysed from Bursea House only one of the glass samples (Table 6.2, analysis 9) revealed the existence of manganese oxide, at 0.1 percent. These features of glass composition provide evidence for the existence of a very conservative Roman glass technology in western Europe.

By comparing a typical Roman glass composition with those found in the Bursea House samples (Table 6.2) it is clear that they are entirely different. The soda, magnesia and calcium oxide levels, in particular, are significantly different and indicate that the overall technologies (melting and softening temperatures) are not the same. The low levels of aluminium oxide in some samples is also diagnostically different. The two samples with high levels of alumina (Table 6.2, analyses 4 and 8) are probably fuel-ash slags. Indeed their elevated levels of ferric oxide of 2.0 and 1.6 per cent clearly provide an additional means of characterizing them. They differ in appearance from the rest of the glasses analysed by having an opal, greenish-brown colour which is a characteristic of glassy fuel-ash slags. They are probably a by-product of iron smelting.

Significant departures from established Roman glass technology have been reported elsewhere (Henderson 1988) and at present these are highly coloured glasses from southern France of first-century A.D. date. The compositional patterns found in these French glasses are different again from Bursea House glass: none contains the low potassium oxide levels found in the Bursea House glass and the phosphorus pentoxide levels detected in the French glass are significantly higher. The incidence of anomalous Roman glass compositions on the site of La Négade (*ibid.*) does, nevertheless, show that some divergence from established Roman LMG compositions occurred.

It might be suggested that the high calcium oxide content in the Bursea House glass is characteristic of a medieval ('forest') glass industry, and indeed some glasses of fourteenth to sixteenth-century date from Orleans share some of the compositional features in Table 6.2 (Velde and Barrera 1986); a significant difference is that the total alkali is always lower in the Bursea House glass. A comparison can be made with glass from geographically closer locations such as the fourteenth to sixteenth-century glass material from the Dominican Priory site at Beverley, North Humberside (Henderson *in press*). A comparison shows that there is some similarity between the Bursea House and Beverley fourteenth-century glass compositions, although again there are no precise compositional parallels. A twelfth-century green ring bead fragment from Lurk Lane, Beverley (Henderson 1991, table 1, analysis 26) also shows compositional parallels, though, as with the Dominican Priory glass, the potassium oxide levels are significantly higher than in that from Bursea House. The glass compositions from the sixteenth-century glass factory sites at Rosedale and Hutton (Crossley and Aberg 1972, 151) have significantly higher calcium oxide, lower magnesia, lower sodium oxide and higher potassium oxide levels; they too are therefore significantly different in composition from the Bursea glass.

Thus, the composition of the Bursea House glass and the other vitreous materials from the site has more in common with the chemical compositions of medieval and later glass than with Roman glass, though there are also problems in finding close parallels amongst glass of twelfth to sixteenth-century date. A post sixteenth-century date of production therefore seems most likely for the Bursea House vitreous material.

Archaeological interpretation

The collection of vitreous material from Bursea House is unquestionably mainly the result of a glass industry. Both the 'scum' from glass production found on the site, which is normally physically removed from the surface of glass batches and melts when various by-products (such as chlorides) are excluded, and the presence of glass 'froth' suggest that glass production occurred at a moderate scale. Froth

Table 6.2

Chemical compositions of the vitreous waste from Bursea House (weight percent oxide) compared with a typical Roman soda-lime composition (from Henderson 1996, table 6f, no. 11)

Artefact	facet-cut cup/bowl	glass lump	sintered glass		waste glass	glass lump	glass lump with surface		vitreous 'slag'	sintered glass	
Artefact number	Fishboure	1	2	2	3	4	5	5	6	7	7
Analysis number		1	2	3	4	5	6	7	8	9	10
Colour	colourless	trgr	tr dgr	ow	opal gr	cobl	cobl scum	blue gr	opal	trbl	ow
Na_2O	16.6	9.1	8.8	8.9	1.0	8.8	7.8	8.4	7.7	8.6	10.3
MgO	0.5	5.7	7.2	3.0	5.7	5.7	5.7	5.8	5.1	6.1	5.3
Al_2O_3	2.6	1.0	2.9	2.7	5.4	0.8	1.1	1.0	6.5	0.9	1.1
SiO_2	68.6	67.6	63.4	70.5	60.0	67.4	67.9	66.8	64.3	66.4	64.6
P_2O_5	ND	ND	ND	ND	0.1	ND	ND	0.1	ND	0.1	ND
SO_3	0.6	0.2	0.2	0.2	0.1	0.2	0.3	0.4	ND	0.2	0.3
Cl	0.9	0.2	0.3	0.2	0.4	0.2	0.3	0.3	0.1	0.3	0.3
K_2O	0.8	0.3	0.3	0.4	1.0	0.3	0.2	0.3	0.5	0.3	0.3
CaO	6.6	15.4	16.2	13.5	23.6	15.5	14.8	16.5	13.1	16.0	14.7
TiO_2	0.1	ND	0.1	0.1	0.2	ND	ND	ND	ND	ND	ND
Cr_2O_3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MnO	ND	ND	ND	ND	0.1	ND	ND	ND	0.1	0.1	ND
Fe_2O_3	0.4	0.3	0.5	0.6	2.0	0.3	0.3	0.2	1.6	0.3	0.3
CoO	ND	ND	ND	ND	ND	0.1	0.1	ND	ND	ND	ND
NiO	ND	ND	ND	ND	ND	ND	ND	0.1	ND	ND	ND
CuO	ND	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND
ZnO	ND	ND	ND	ND	ND	ND	ND	0.2	0.1	ND	ND
As_2O_3	ND	0.4	0.3	0.1	ND	0.3	0.7	0.8	0.1	0.8	0.7
SnO_2	ND	ND	ND	ND	ND	ND	ND	ND	0.1	ND	ND
Sb_2O_3	2.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BaO	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1
PbO	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND

Key:
ND = not detected
trgr = translucent green
cobl = translucent cobalt blue
dgr = dark green
trbl = translucent blue
opal gr = green vitreous material with a brownish tint
ow = 'opaque' pale translucent glass

would be formed by gases generated from glass fusion rising to the surface of the glass batch; particularly frothy areas would accumulate at the top of the melt and be removed. No crucibles or other glass-making vessels have yet been found at Bursea House and these are particularly crucial in the reconstruction of an ancient glass industry.

As yet, none of the artefacts discussed here can be proven to have derived from unquestioned Roman contexts (compare Henderson 1989, 47). Dark green and cobalt blue glass are colours which rarely occur after the first century A.D. in the Roman world; scum from glass melts is unusual on Roman glass production sites (Dr Jenny Price *pers. comm.*) with an example deriving from the fourth-century glass factory at Jelame, in Palestine (Weinberg 1988). Excavation at Jelame produced a vast amount of waste material, possibly the largest quantity from any excavated Roman glass-working site, so it is this level of production where one is likely to find such scum. Apart from deliberately-made glass, another vitreous material, fuel-ash-slag, is found on Roman industrial sites, particularly those on which there is evidence for iron smelting (Allen and Fulford 1987). This can lead to a mis-identification of the slag as deliberately made 'glass'; the opaline appearence of artefacts 3 and 6, together with their high aluminium oxide and iron oxide levels indicate that they are fuel-ash slags, and may result from iron-working.

The vitreous material from Bursea House is therefore very interesting, particularly in the context of the evidence from other Roman industries of potting and iron production at Bursea House and elsewhere in the immediate area. At present the composition of the industrial glass from Bursea House is anomalous in a Roman context and it is probably late medieval or, in view of the arsenious oxide component, post-medieval.

PART 3
THE MARKET WEIGHTON BY-PASS

CHAPTER 7

EXCAVATIONS AT HAWLING ROAD

edited by John Creighton

7.1 Authorship

The work of many individuals has been edited to integrate specialist reports with structural information to form a chronological narrative. Within this the work of the individual authors has occasionally become obscured. Where possible sections have been ascribed to individual authors. Much of the integration of the different data sets has been undertaken by Jeremy Evans.

7.2 Introduction

In 1989 a By-pass was constructed around the town of Market Weighton. Field-walking of the road-line by Peter Halkon had indicated ten areas of potential archaeological significance (Illus 7.1). The greatest concern was for a dense scatter of Iron Age and Roman pottery in a field adjacent to Hawling Road (SE 873412) only 2.5km from the Roman settlement at Shiptonthorpe. In 1843 a Roman coin hoard had been discovered here, recorded by the Ordnance Survey, though no records of its original contents have survived. Metal-detecting on the site had revealed further coins and other items. In conclusion it appeared that Hawling Road represented a rural settlement with a broad range of Iron Age and Roman material culture.

Within the context of the Holme Project, this represented a type of site not previously investigated so with funding from English Heritage an excavation took place in the late summer of 1989, with further work along the road-line whilst construction was underway. A second excavation was undertaken where the By-pass crossed the suggested line of the Malton to Brough-on-Humber Roman road (though this revealed little); and environmental samples were recovered where the road cut the Market Weighton and Skelfrey Becks.

This report deals with the Iron Age and Roman evidence from the work on the By-pass. First the report summarizes the environmental setting, thereafter it is arranged as a chronological narrative tracing the changing nature of occupation. At the end is a section on the ceramics which provides a type series for later Iron Age pottery in the area.

Information about the earlier prehistoric remains and environmental evidence will be published elsewhere (Halkon *et al. forthcoming*). The finds and full archive are in Hull Museum (accession number KINCM 11.1989).

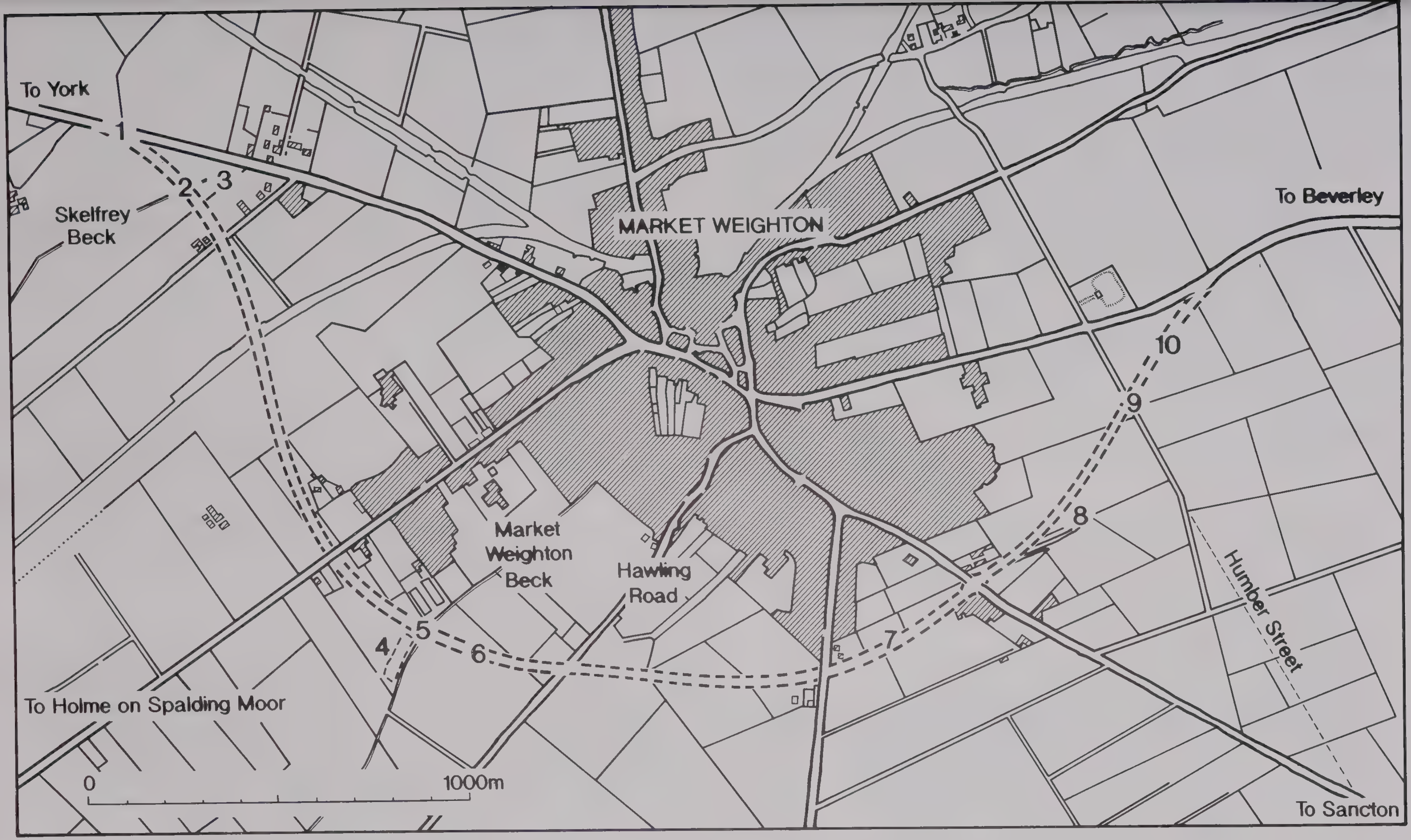
7.3 The environmental setting

The By-pass traverses part of the eastern flank of the Vale of York, a wide heavily drift covered lowland, flanking an escarpment slope formed by a thin band of Jurassic rocks, and then the Cretaceous formation of the Yorkshire Wolds. Much of the terrain crossed by the road comprised glacial sands and gravels, though alluvial deposits, soft organic clay and peat, were encountered where the road crossed two streams: Market Weighton Beck and Skelfrey Beck.

During the Iron Age the site was located on the fringe of an area encompassing a distinctive Iron Age burial rite usually termed the 'Arras culture'. Indeed Hawling Road lies just below the type-site on Arras Hill, just to the east on the edge of the Wolds. The site lies at the northern extent of a dendritic creek system which fed into Walling Fen and thereafter the River Humber (Illus. 8.1). During the late Iron Age iron smelting sites were established on the edge of this creek system utilizing the fuel resources and bog iron ore (above Chapter 4). In the Roman period production diversified with the manufacture of ceramics on the sandy ridges close to the water courses. As time progressed kilns were established further from the water's edge. It was considered that this may have been a consequence of fuel depletion as woodland was cleared, so evidence for woodland management became one of the primary objectives of the Bursea House excavations (above Chapter 5). The growth in the number of kiln sites culminated in the extensive fourth-century Holme-on-Spalding Moor greyware industry (Halkon 1990, 154).

Environmental evidence was therefore sought to gain more information about the changing nature of the landscape. Pollen cores from the Great Wold Valley suggest that there was already persistent open grassland on the Wolds, maintained by grazing animals, by 6000 B.C. This was largely cleared and used for mixed pastoral and arable farming by about 2000 B.C. (Bush 1988). Off the chalk, however, to the east in Holderness there is evidence for little significant clearance until the Iron Age when the stronger plough then available made possible the tilling of the heavy lowland soils. This is demonstrated by the Roos Carr pollen core where tree pollen is dramatically replaced by a wide range of herbaceous types again suggesting mixed farming (Flenley 1990; Beckett 1981).

Our knowledge of environmental change on the western side of the Wolds is more limited. Like Holderness, clearance probably only took place relatively late in the first millennium B.C. Work on the Hasholme boat demonstrated that the Walling Fen creek system was probably estuarine as far in-



Illus. 7.1 *Map of the Market Weighton By-Pass showing the location of identified archaeological features along the route: (1) barbed and tanged arrowhead, (2) Skelfrey Beck - environmental samples taken, (3) sherds of Romano-British pottery, (4) bones of red deer and a dog recovered from the peat, (5) Market Weighton Beck - environmental samples taken, (6) Hawling Road excavation, (7) sherds of Romano-British pottery, (8) sherds of Romano-British pottery, (9) section excavated across Humber Street (supposed line of Roman road) (10) neolithic flint scraper*

land as Hasholme in the late first millennium BC, but it also suggested that woodland clearance had not happened before the middle Iron Age (Millett and McGrail 1987). On the other hand the aerial photographic evidence shows a series of what appear to be later Iron Age or Roman sites exploiting the creek margins, with enclosures and droveways suggesting the possibility of seasonal grazing (above Chapter 2.2).

More tangible evidence came from the excavation in 1985 of a section across the Roman road where it passed through the site at Shiptonthorpe (SE 853424). Here evidence suggested that trees had been removed and the surface ploughed as part of the clearance process immediately before the road was built, presumably in the last decades of the first century A.D. (Millett and Halkon 1988, 41).

Within this context additional evidence was sought about the extent of woodland clearance in the vicinity of the Market Weighton By-pass. Road construction began close to Shiptonthorpe, and here it crossed a small stream called Skelfrey Beck. Here a section was cut in order to recover environmental evidence. The results contrast with the section at Shiptonthorpe suggesting a rather more open grazed landscape in the later prehistoric period, though dating is problematic.

7.3.1 The Skelfrey Beck section

(based on work by Pat Wagner)

A small section was cut into the face of the culvert parallel to the Beck (Illus. 7.1, no. 2; SE 86404225). The insect assemblages retrieved from the environmental samples collected were analyzed by Pat Wagner. Her full report is to be published elsewhere (Halkon *et al. forthcoming*).

The sample location was a relict stream bank. Thus samples were numerically dominated by species living, breeding and dying within the shallow water around vegetation. The assemblages retrieved provide evidence for a moderately constant waterside environment spanning the period of deposition. The lateral influence of the water course was limited. Aquatic emergent plants consistent with fen, marsh and bog were represented by their associated faunas, but at lower proportions than would be commensurate with adjacent fen or marshland. Open territory beyond the immediate influence of the water was evidenced by other components of the fauna. Grassland that bordered the stream was grazed by large herbivores, possibly including horses, and had a varied flora, some of the plants are indicative of disturbed ground particularly nettles and docks. This is not inconsistent with the churning of the ground by animals coming to drink at the water. Although there is no evidence for extensive woodland there were indications of trees in the landscape. Willow and alder could have been growing close to the stream with stands of oak, ash and other deciduous trees in the vicinity or upstream.

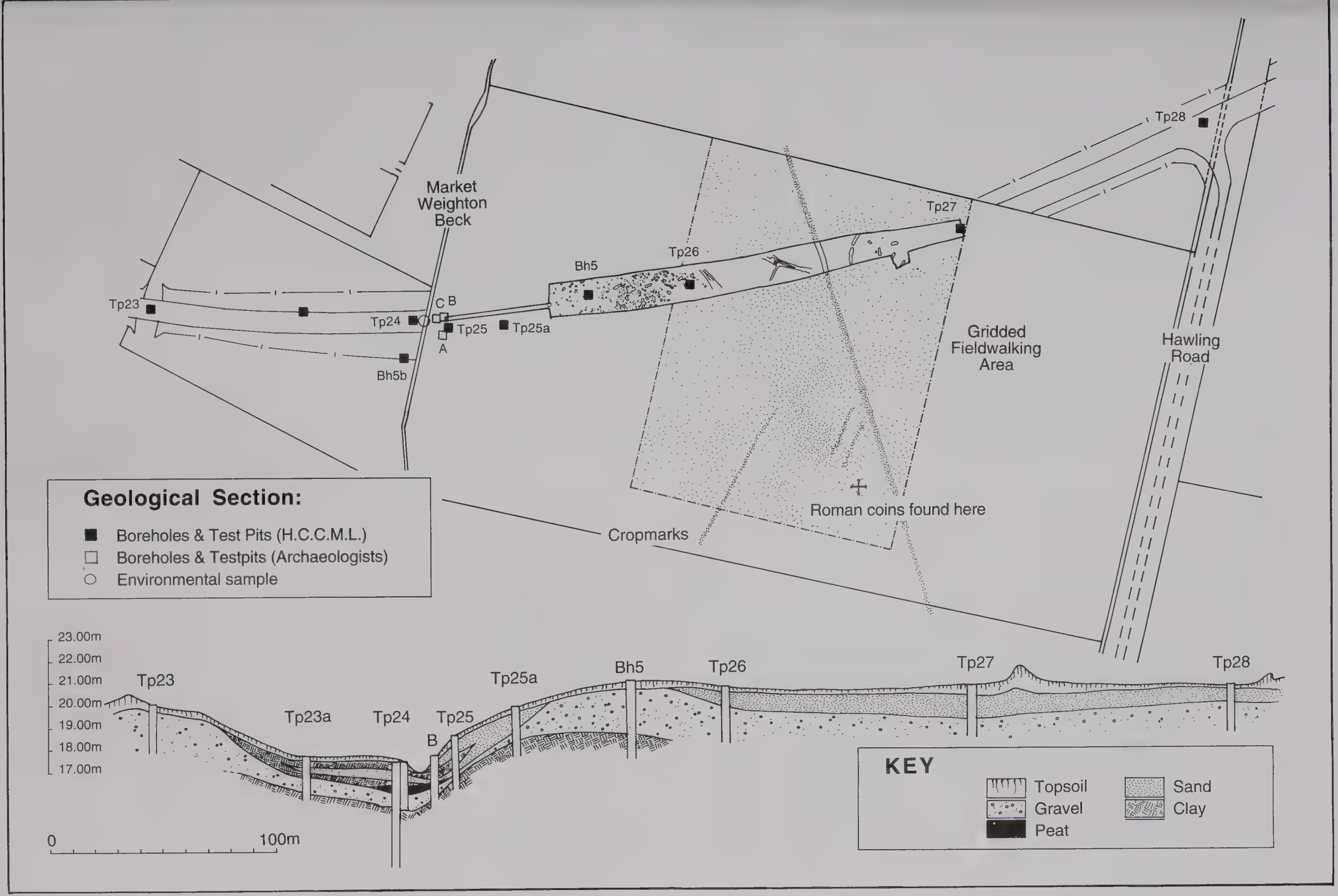
The sequence was probably deposited over decades rather than centuries as indicated by the nature of the sediment and the underlying unity of the environment as interpreted. The sequence is not independently dated and one needs to be very cautious about using the inferred environment as a basis for suggesting the ages of the samples as the present day habitats of particular species have been influenced by environmental degradation as well as past climatic change. Nevertheless, the presence of a range of species, all of which now have more southern distributions, would certainly suggest a date before the post-medieval 'Little Ice Age' at the latest when mean winter temperatures were lower than those now prevailing. Indeed the samples are probably much earlier. Osborne (1982) has suggested that the presence of *Onthophagus* spp. is indicative of a prehistoric date as only a few specimens of *Onthophagus* sp. have been found in post Bronze Age samples, despite a number of suitable sites and deposits. None has been found in deposits younger than Roman age and all are from the southern half of Britain. Osborne postulated climatic deterioration for the restriction and loss of species from this genus, as their habitat of dung in open grassland has not been drastically reduced until recently. Although only two specimens of *Onthophagus ovatus* were identified, their presence at this comparatively northern location can be tentatively offered as evidence for a later prehistoric date.

Whilst the date of these samples is insecure, the interpretation of open pasture is different to that of late first century A.D. woodland suggested at Shiptonthorpe, only a small distance away. Whilst the late prehistoric date for the Skelfrey Beck samples may be in error, it is likely that even late into the Iron Age woodland clearance in this area was very uneven and extremely localized.

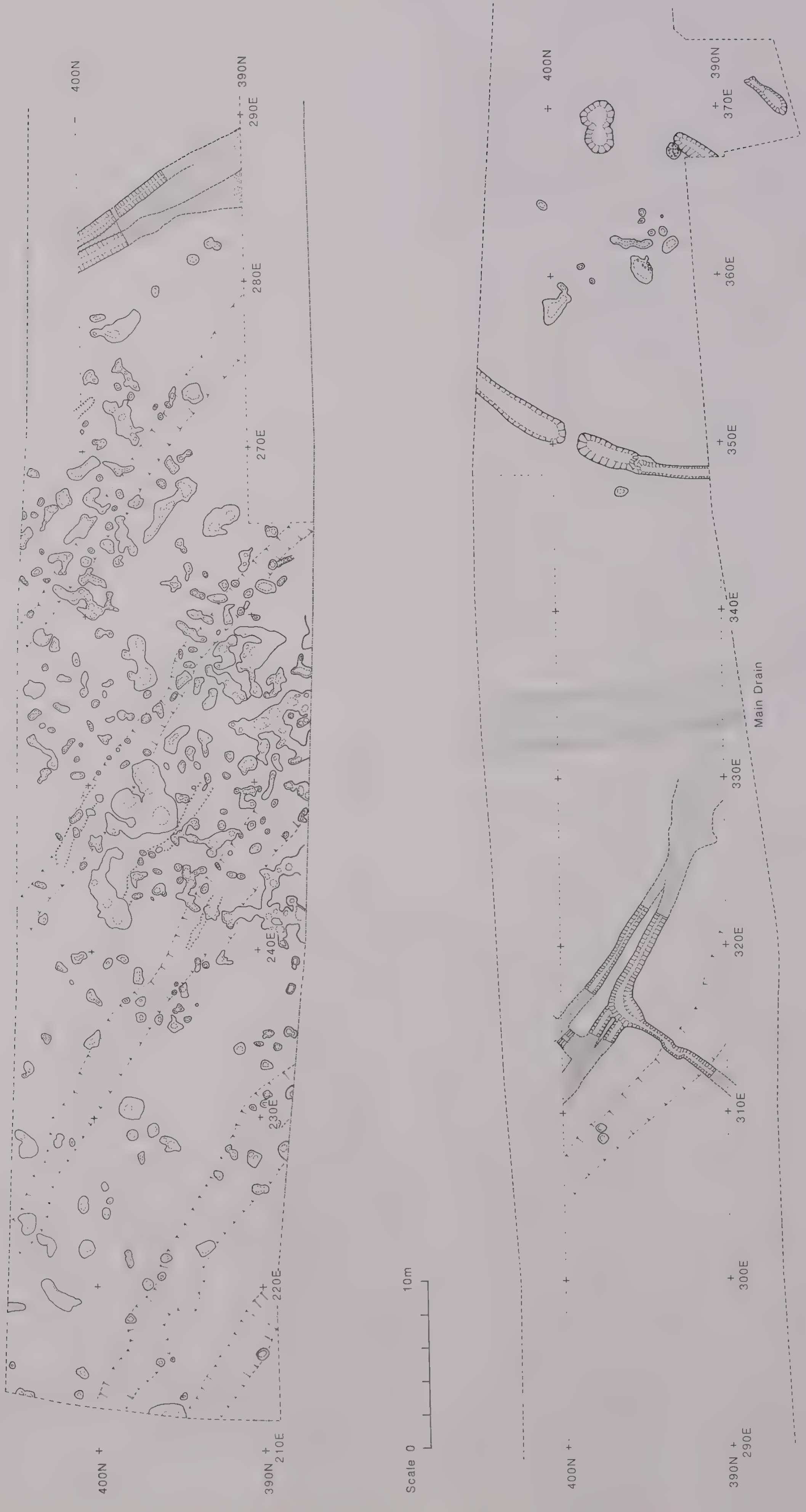
7.4 The excavations

Within this partially cleared landscape below the Wold edge a small rural settlement was established in the Iron Age on a gravel and sand ridge adjacent to Market Weighton Beck (Illus. 7.2). Occupation lasted into the later Roman period, though the focal point of the settlement shifted southwards over time. The By-pass cut across the Iron Age and early Roman section of the site. Since an Iron Age to Roman rural site had not yet been sampled within the structure of the Holme Project the opportunity was taken to excavate the threatened area. Over 2800m² was excavated and a watching brief was carried out along the rest of the stretch.

The excavated area was approximately 190m long by 15m wide (Illus. 7.2 and 7.3). The site can be divided up into two principal areas. The western half (212-280E) revealed a large number of negative features cut into a gravel subsoil, most of which were probably natural periglacial hollows. The area had also been heavily scarred by medieval furrows. In the eastern half (280-400E) the sandy subsoil had been less able to withstand the rigours of the plough, and so not even the medieval furrows survived other than as faint stains in the sand. The bottoms of several enclosure ditches did survive as well as a number of features to the east (350-370E), although the absence of evidence between may be more apparent than real. The fills of all the post holes and pits were passed through 4mm sieves and all spoil was metal-detected. Ini-



Illus. 7.2 *Geological section based upon excavation, bore-hole and test-pit data*



Illus. 7.3 *Hawling Road. Overall site plan*

tially flotation samples of all stratified contexts of sufficient size were taken on a 20 percent random sampling basis. However due to the lack of material recovered from flotation, this sampling was suspended after twenty-five samples had been processed.

There was minimal vertical stratigraphy on the site, except for the ditch sequences and the large intercutting pits. This has meant that phasing could not be carried out independently of the ceramic dating evidence. Illus. 7.4 and 7.5 show the contexts allocated to six broad phases. The features in black represent contexts which contained material of that date, those shown in outline are either unphased or contained earlier ceramics which could be residual. The vast majority of the features remain unphased. Nonetheless, despite the lack of stratigraphic evidence, an analysis of the ceramics from the site has demonstrated a number of significant changes from the late Iron Age to the end of the fourth century A.D.

7.4.1 The ceramics

(based on the work of Jeremy Evans)

Some 4256 sherds of pottery were examined from Hawling Road, 1868 sherds were from the stratified contexts, the vast majority of the remainder being from the base of the ploughsoil and the gridded field-walking programme. Full fabric descriptions, a form typology and discussion of the quantified groups are provided below (Chapter 7.6).

The excavated material from Hawling Road provides a useful sequence of the ceramics in use on a rural site in the later Iron Age and first and second centuries A.D. The field-walking material comprises a complementary collection, principally of the third and fourth centuries A.D., the result of a minor shift in the location of the settlement to the south. The collection provides a useful opportunity to examine the Romanization of pottery in use on rural sites in East Yorkshire. It may be compared with material from the Langton 'fortlet' (Corder and Kirk 1932), the site of the later Rudston villa (Rigby 1980) and the pre-villa ditch at Beadlam (Evans 1996).

Given that it proved impossible to phase many of the features closely, especially those from towards the eastern side of the site which lacked finds, it was thought worthwhile to examine the unstratified material from over these areas to see if variations might indicate differing intensities of occupation through time. Table 7.1 and Illus. 7.6 show the results of this study. Some patterns can be discerned in the data. There do seem to be noticeable variations in the recovery rate from different areas with most material coming from 220-230E, 270-280E, and least from 350-360E, yet from 270-280E all types are found in increased frequency, with the reverse in 340-370E. The patterning of the Iron Age and Roman material thus largely reflects the presence of underlying ditches and gullies.

Given the dominance of Iron Age and early Roman material culture from the excavation and later Roman material from the field-walking collection immediately to the south, this report discusses them in sequence, returning at the end to make comparisons between the two assemblages.

7.4.2 The Iron Age and early Roman occupation

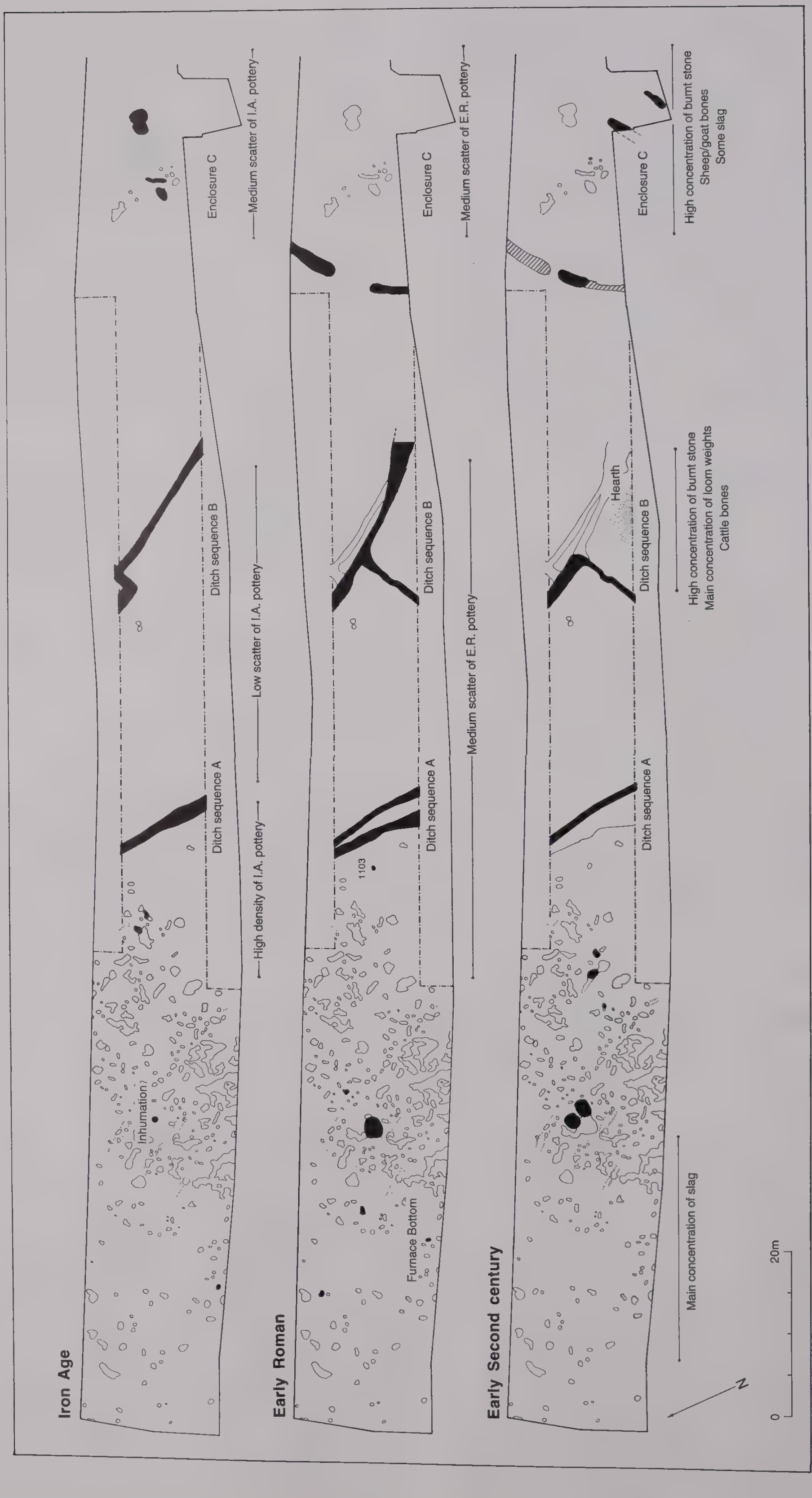
The enclosure system

Iron Age material (for this purpose fabrics G01, G03, G096, G28, G293, G32, and G52) is fairly common from 260-340E and from 360-80E (cf. Illus. 7.6), whilst early Roman material is concentrated in 250-340E. Thus the enclosure from 345E eastwards would appear to be primarily associated with

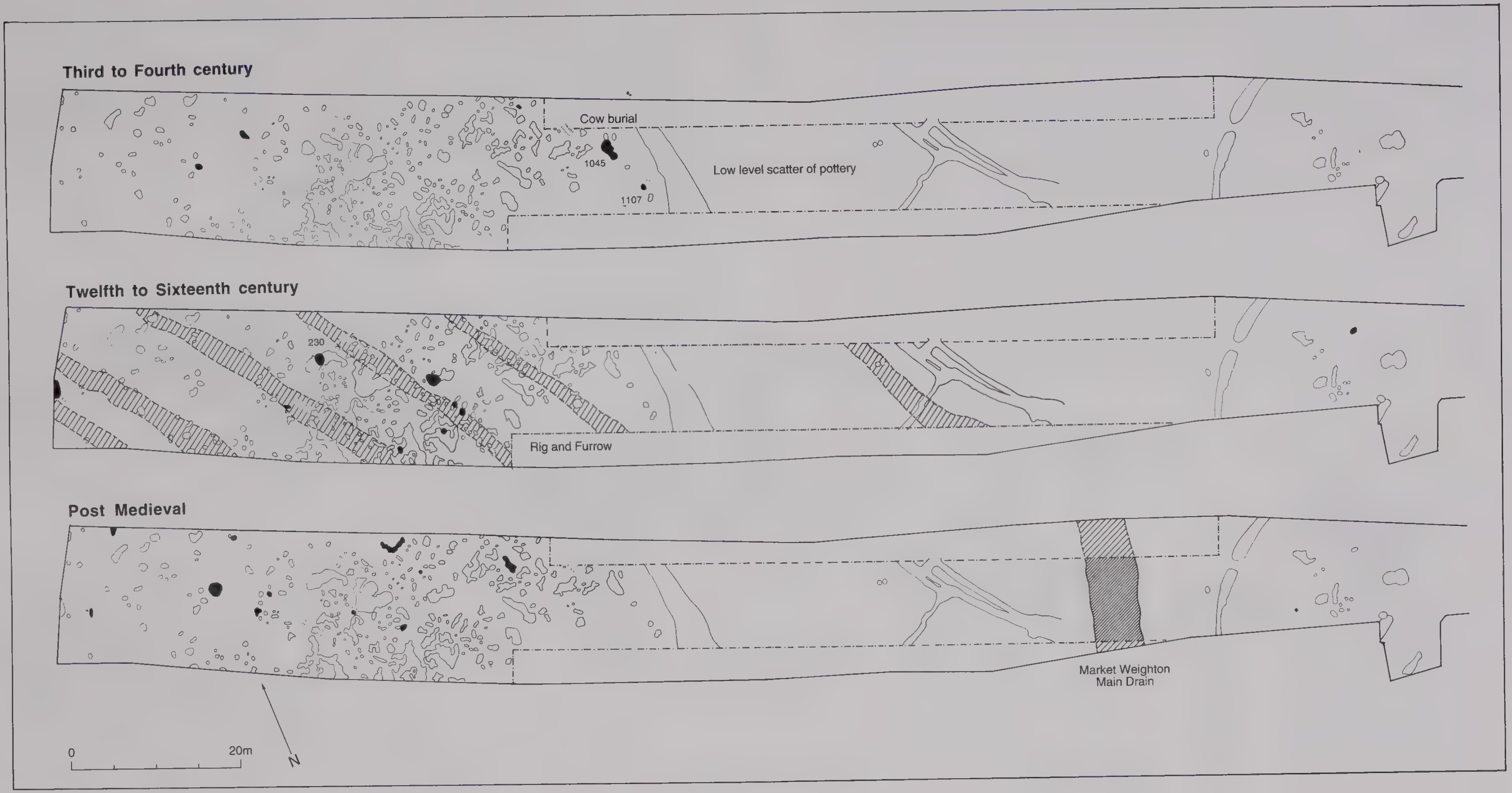
Table 7.1

Hawling Road. The distribution of dated unstratified material over the excavated area

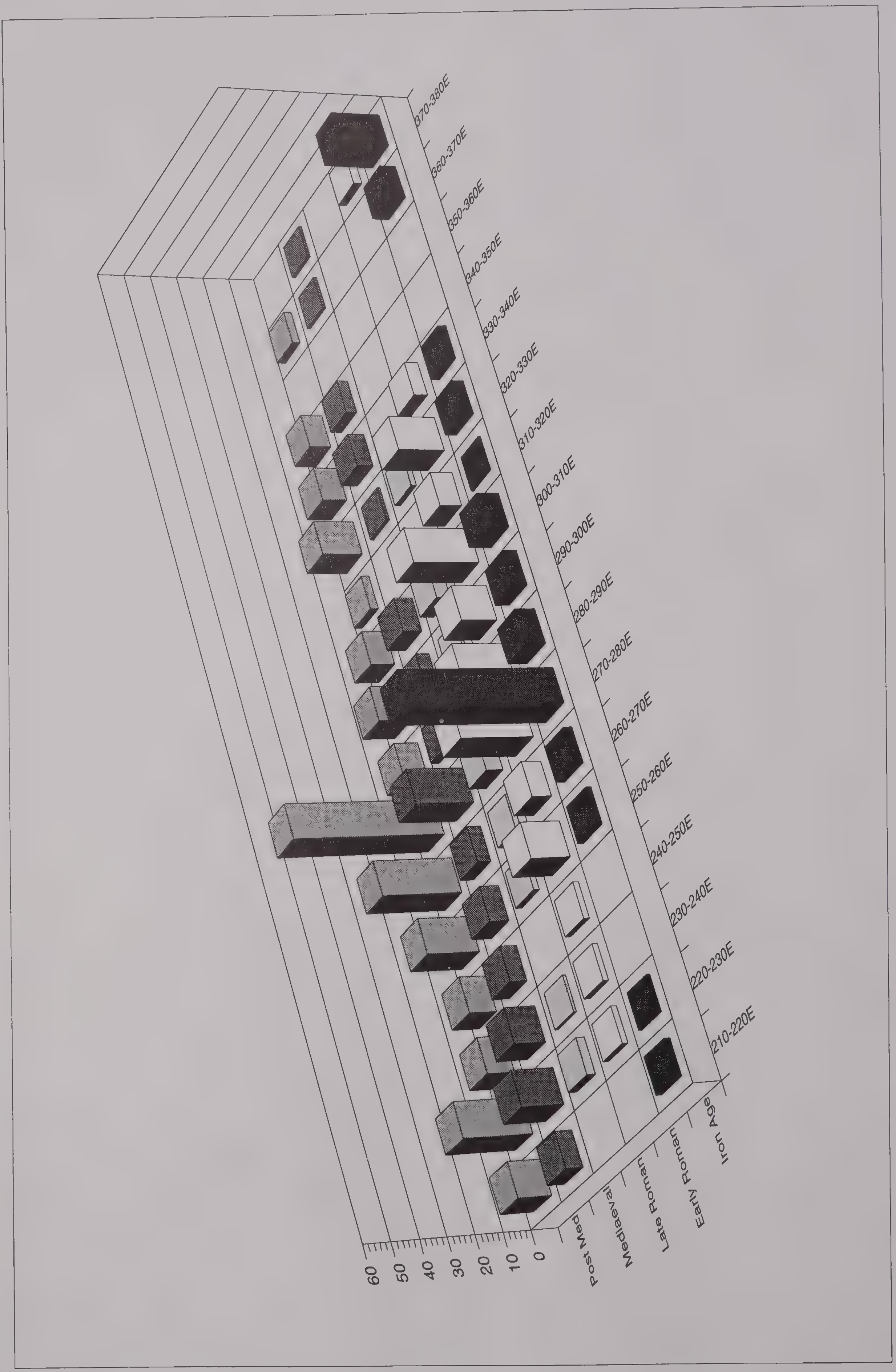
Co-ordinates	Iron Age	Early Roman	Late Roman	Medieval	Post-Medieval
210–220E	2	0	0	6	12
220–230E	1	2	3	15	25
230–240E	0	2	1	11	10
240–250E	0	2	0	6	10
250–260E	2	14	2	7	19
260–270E	3	7	2	5	29
270–280E	55	26	6	21	55
280–290E	7	19	0	3	9
290–300E	5	13	1	5	12
300–310E	8	24	5	7	9
310–320E	1	8	0	0	3
320–330E	4	17	2	1	15
330–340E	3	5	0	6	9
340–350E	0	0	0	4	8
350–360E	0	0	0	0	0
360–370E	6	0	0	1	3
370–380E	18	3	0	1	0


Iron Age
Enclosure C
Medium scatter of I.A. pottery
Ditch sequence B
Low scatter of I.A. pottery
Ditch sequence A
High density of I.A. pottery
Inhumation
Early Roman
Enclosure C
Medium scatter of E.R. pottery
Ditch sequence B
Medium scatter of E.R. pottery
Ditch sequence A
1103
Furnace Bottom
Early Second century
Enclosure C
High concentration of burnt stone
Sheep/goat bones
Some slag
Hearth
Ditch sequence B
High concentration of burnt stone
Main concentration of loom weights
Cattle bones
Ditch sequence A
Main concentration of slag
N
0
20m

Illus. 7.4 *Hawling Road. Dated features: Iron Age, early Roman and second-century features*


Third to Fourth century
Cow burial
1045
1107
Low level scatter of pottery
Twelfth to Sixteenth century
230
Rig and Furrow
Post Medieval
Market Weighton Main Drain
0
20m
N

Illus. 7.5 *Hawling Road. Dated features: third- to fourth-century, medieval and post-medieval features*



Illus. 7.6 Hawling Road. Unstratified pottery from the excavation divided by date and area

Iron Age material, a conclusion which is confirmed by analysis of the stratified finds.

Illus. 7.7 shows the features in the area of the Iron Age concentration. Most of the pits and gullies were indeed Iron Age (except for one second-century post hole and a couple of medieval features), however, the ditch [4033, 4036] just to the west was apparently later in date, containing material from the later first and second centuries. Other second-century features were the two parallel gullies [518, 527] which joined up with a cropmark feature to form one end of a long droveway (Illus. 7.2).

Illus. 7.8 and 7.9 show the stratigraphic sequences from the two ditch sequences, A and B, around 280-290E and 310-330E respectively. Both were constructed in the Iron Age and modified into the second century A.D. The overall structure of the enclosure system is difficult to reconstruct since the field rarely produces cropmarks and resistivity could not clearly differentiate features cut in sand and filled with sand. Ladder settlements (cf. Dent 1982) are, however, a frequently occurring type of rural settlement in East Yorkshire, and whilst these two ditch series are not precisely parallel, this form of enclosure is by no means unlikely. In this case the early Roman period would have seen a series of subdivisions made within the enclosure by the insertion of two sets of ditches more or less at right angles (310-320E and *c.* 350E).

The crouched inhumation

(with information from C. M. Marlow)

One other area provided a reasonable survival of stratigraphy. Around 249E, 396N were a series of intercutting pits (Illus. 7.10) in the earliest of which was a crouched inhumation burial. Securely stratified with the burial was one fragment of Iron Age or early Roman pottery. The burial pit was itself cut by a larger one [800] containing only Iron Age pottery, and this was cut by two later first or second-century pits [326 and 327] containing pottery, bone, slag and flint. Parallels for this type of burial can be found on a number of Iron Age to Roman ladder settlements in East Yorkshire (cf. Dent 1982).

The burial was of a child aged 6±2 years old. Although much of the skeleton had survived, the bones were generally fragmentary with considerable surface erosion. The skull was very distorted. Age estimates were derived from the pattern of dental development, which provides the most accurate assessment, as well as from the diaphyseal length of the right femur. The dentition gave a developmental age of 6±2 years and the long bone measurement suggests an age of approximately 5 years which is consistent. The methods used were those outlined by the Workshop of European Anthropologists (1980).

Pathology: although very eroded there appeared to be some pitting and small deposits of new fibre bone on the endocranial surface of the parietals. Such lesions may suggest porotic hyperostosis probably caused by anaemia, but the condition of the specimen prevented a definite identification. The orbits were too damaged to assess the presence of the associated condition, *cribra orbitalia.*

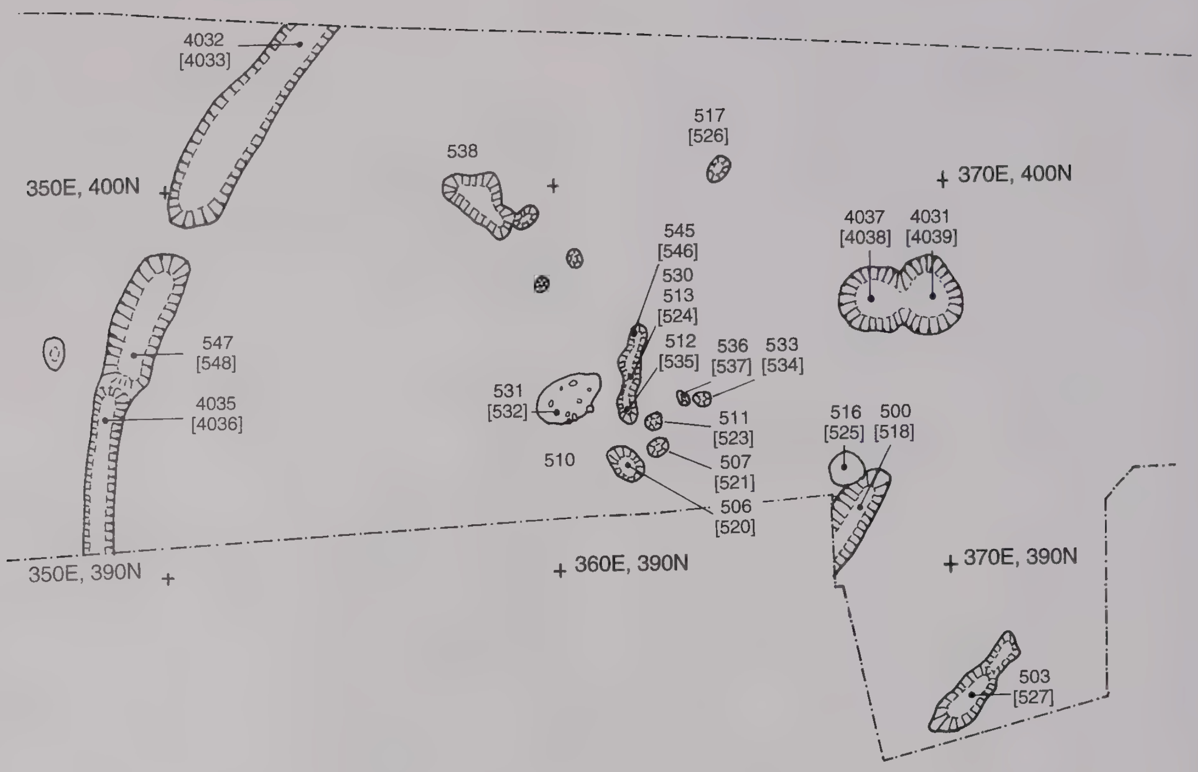
Perhaps one of the most curious aspects of this inhumation was that it provided a focal point for activity over a century or more with the pits being cut and recut in this location, carefully positioned around the grave avoiding cutting into it. Some form of marker must have been erected or ritual repeatedly enacted to keep the location memorable. It is possible that some of the undated features around the burial relate to an associated structure but it is impossible to be certain.

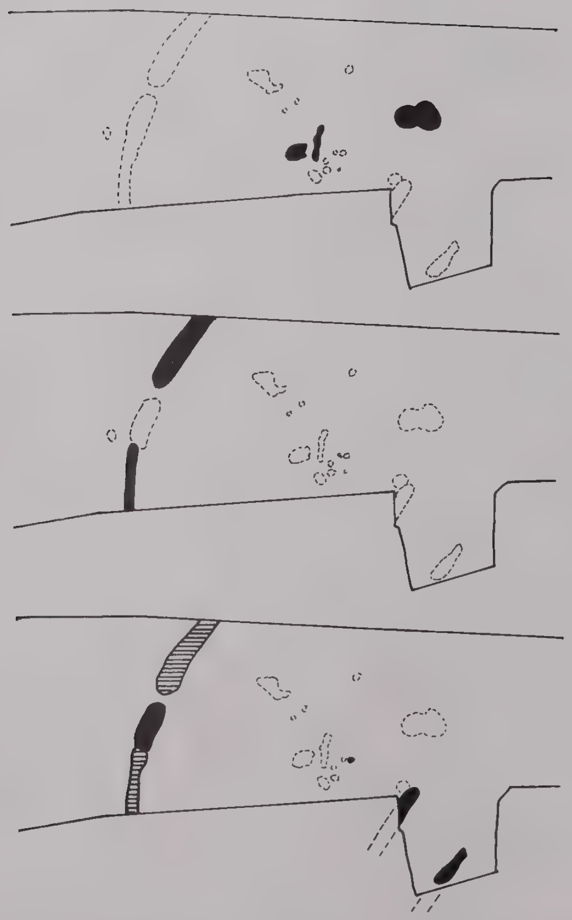
The Iron Age and early Roman pottery

by Jeremy Evans

Illus. 7.10 shows the percentage proportions by sherd numbers of the fabric groups (below 7.6) arranged in their likely chronological order. In the deposits attributed to the Iron Age, two fabrics (G01 and G096), both calcite gritted, account for over 80 percent of the assemblage with smaller quantities of fabrics G07, G28, G293 and G32 and presences of fabrics G03, G093, G097, G14, G29, G291, G41 and G52. The proportion of calcite gritted wares declines in the first-century groups and they may well have become residual by the early second century. Although in the first century three fabrics G28, G29 and to a lesser extent G25 do increase, the general picture is of increasing fabric diversity when compared with the Iron Age, but with very small proportions of all types. It would appear that either the tradition of fabric manufacture had been broken, or more likely, that the social network structuring fabric supply had been interrupted with the conquest. Calcite would not have been available on the site so either the calcite gritted wares or the calcite came, at nearest, from the Wolds to the east. Most of the minor fabric types which replace calcite gritted ware supply do not seem to have been noted elsewhere, even at the neighbouring roadside settlement site of Shiptonthorpe and production on the site, or very nearby, seems likely. Fabric G29 runs at around 10 percent in the first-century groups but seems to rise to around 20 percent in those of the second century, the exceptional peaks in groups 277 and 286 are the result of the presence of complete vessels in them. Fabric G28, although Iron Age in origin, seems to rise to around 15 percent of the first-century group but then tails off and might well be residual in the second century. Fabric G33 seems to be a minor first-century fabric running at up to 10 percent of the groups, but seems to fade out in the second century. Wheel-made fabrics appear in the earliest first-century groups, generally at less than 10 percent and their proportion does appear to rise slightly in the second century to around 10 percent (Illus. 7.11). A very small proportion of the greywares is in rustic ware, all of this in fabric R18 which does not seem to appear until late in the first century. It is notable that much higher proportions of wheel-made fabrics (26 and 32 percent) come from the ditch fills in the area 280-290E (ditch sequence A), which hints at some differential spatial distribution of fabrics across the site, perhaps related to function and status.

Mortaria appear in small quantities from the first century, as they do on many rural sites (cf. Dore 1983). Their presence on these sites, even if in slightly lower proportions than at





Phasing

Iron Age

510	Spread	Iron Age pottery; a whetstone and some bone
530	Gully [524]	Iron Age pottery
531	Pit [532]	Iron Age pottery; and some bone
5031	Pit [4039]	Iron Age pottery; and some flint and bone
4037	Pit [4038]	Iron Age pottery; and some bone

Early Roman

4032	Ditch N. [4033]	Early Roman pottery, 6% wheel made; and some slag and flint
4035	Ditch, S. [4036]	Iron Age pottery; and some bone

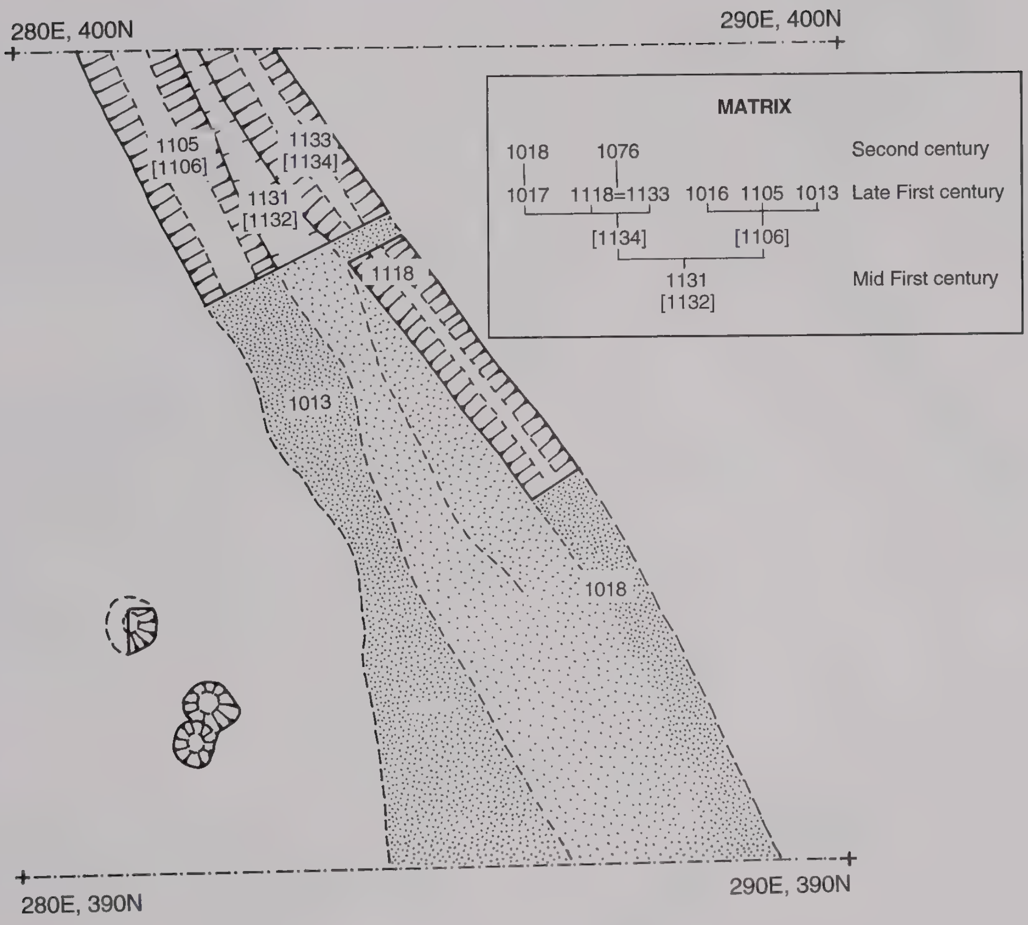
Early Second Century

503	Gully S. [527]	First to second century pottery
500	Gully N. [518]	First century pottery, <1% wheel made; and some slag, cinder and bone
547	Ditch [548]	Flavian to Trajanic pottery, 4% wheel made; and some cinder
533	Post Hole [534]	Flavian pottery, 9% wheel made; and some bone

Later (not illustrated)

517	Post Hole [526]	14-16th century pottery; and some bone
1031	Post Hole [4040]	Early Post Mediaeval pottery

Illus. 7.7 *Hawling Road. Phasing of western enclosure 350-370E*



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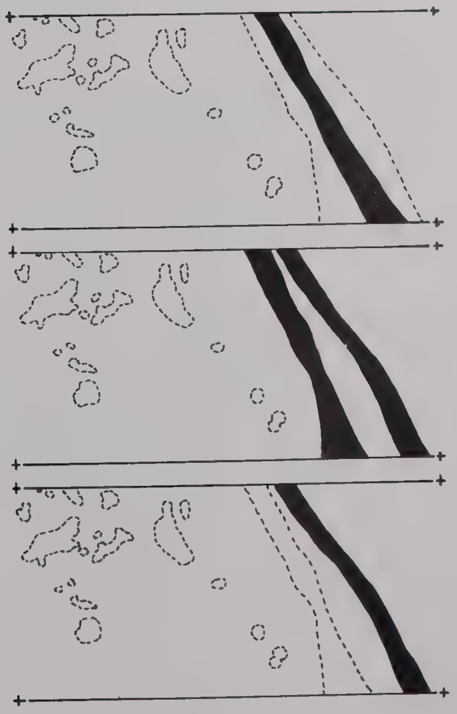


Mid First Century

1131	Ditch [1132]	First century potterybone

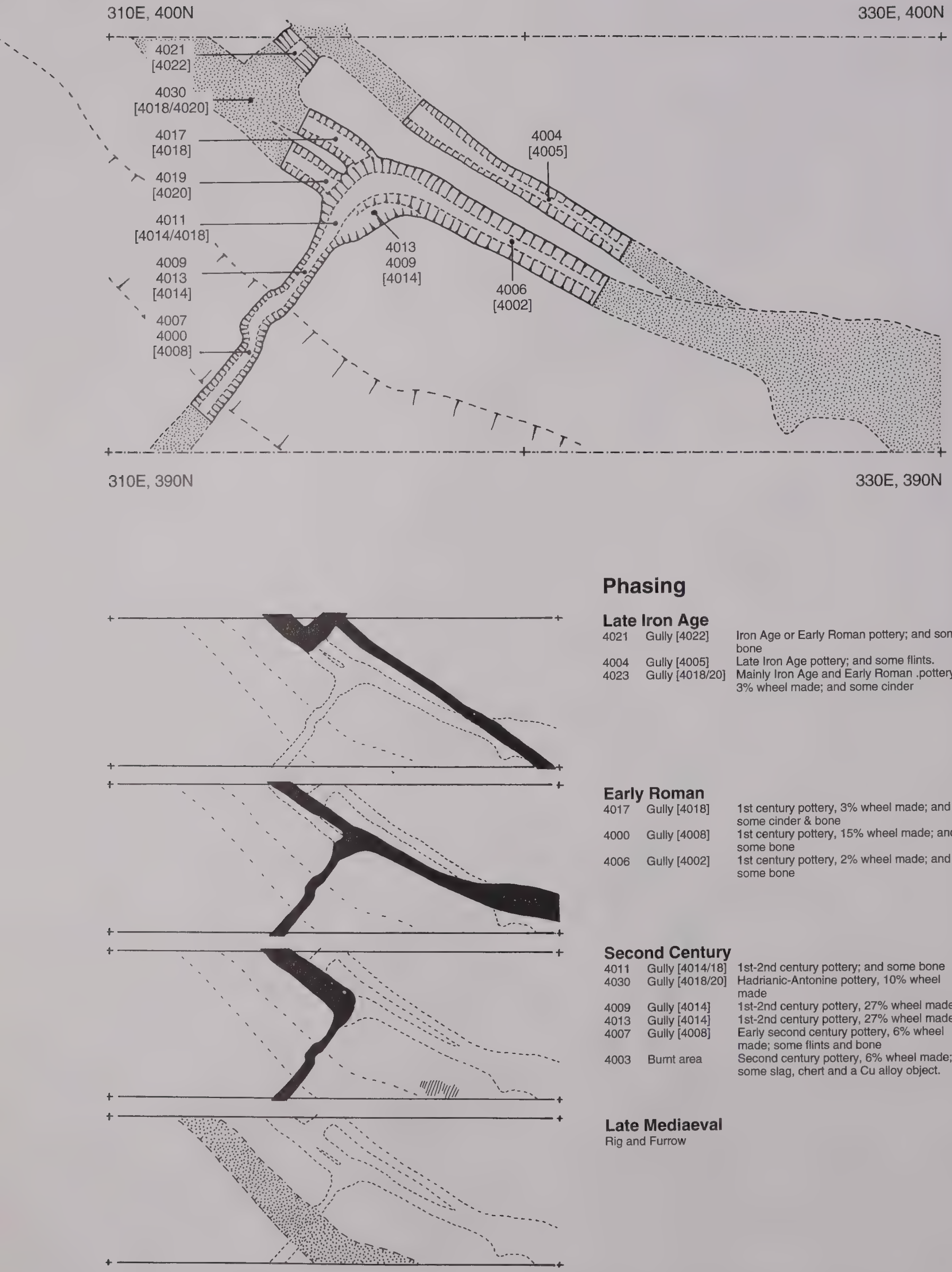
Later First Century

1017	Ditch [1134]	First century pottery, 26% wheel made; and some flint and bone
1133	Ditch [1134]	Early Roman pottery, 30% wheel made; and some flint and bone
1016	Ditch [1106]	First century pottery; and some bone
1105	Ditch [1106]	Flavian pottery; and some bone
1013	Ditch [1106]	Early Roman pottery

Second Century

1018	Ditch [1134]	Second century pottery
1076	Ditch [1132/34]	First to second century pottery; and some bone.

Illus. 7.8 *Hawling Road. Phasing of ditch sequence A: 280-290E*



Phasing

Late Iron Age

4021	Gully [4022]	Iron Age or Early Roman pottery; and some bone
4004	Gully [4005]	Late Iron Age pottery; and some flints.
4023	Gully [4018/20]	Mainly Iron Age and Early Roman .pottery, 3% wheel made; and some cinder

Early Roman

4017	Gully [4018]	1st century pottery, 3% wheel made; and some cinder & bone
4000	Gully [4008]	1st century pottery, 15% wheel made; and some bone
4006	Gully [4002]	1st century pottery, 2% wheel made; and some bone

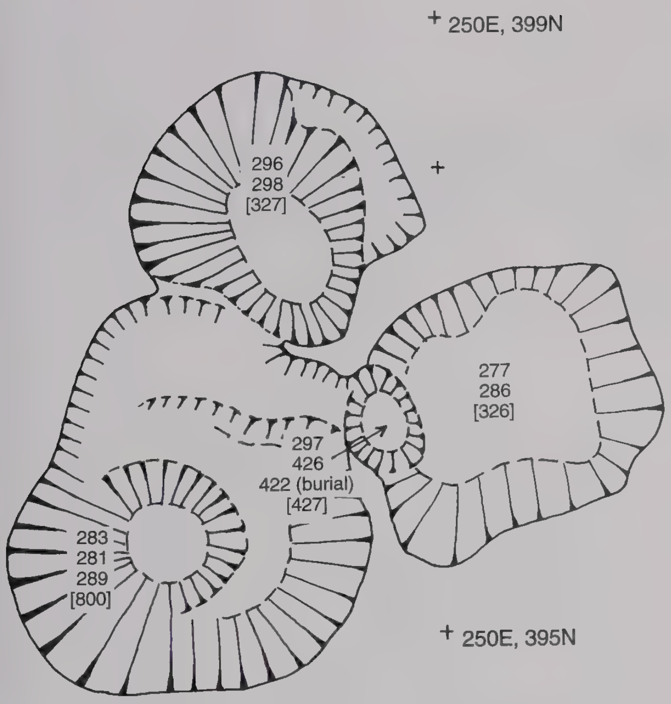
Second Century

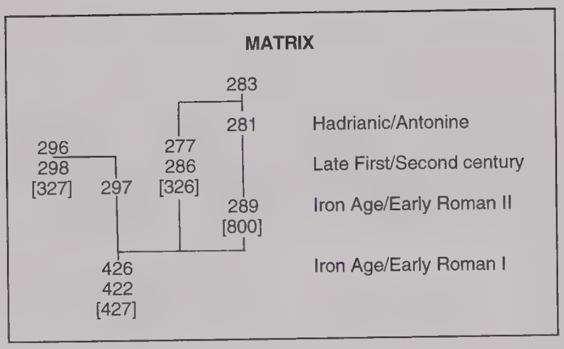
4011	Gully [4014/18]	1st-2nd century pottery; and some bone
4030	Gully [4018/20]	Hadrianic-Antonine pottery, 10% wheel made
4009	Gully [4014]	1st-2nd century pottery, 27% wheel made
4013	Gully [4014]	1st-2nd century pottery, 27% wheel made
4007	Gully [4008]	Early second century pottery, 6% wheel made; some flints and bone
4003	Burnt area	Second century pottery, 6% wheel made; some slag, chert and a Cu alloy object.

Late Mediaeval

Rig and Furrow

Illus. 7.9 *Hawling Road. Phasing of ditch sequence B: 310-330E*

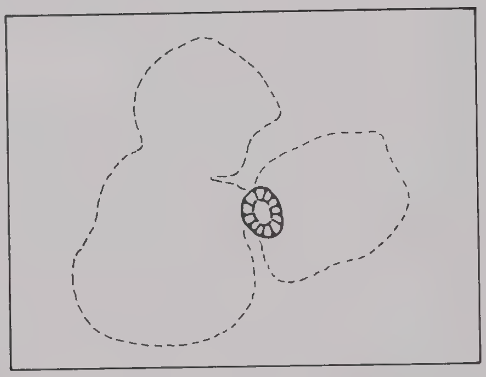




Phasing

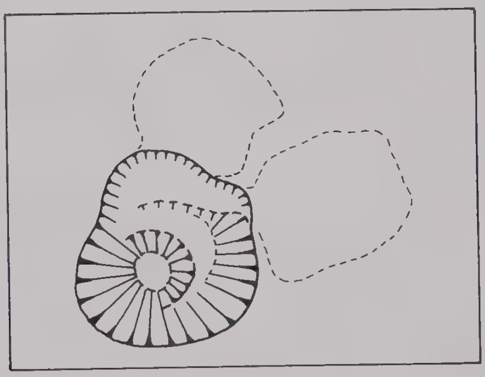
Iron Age / Early Roman I

426	Burial [427]	Iron Age or Early Roman pottery; and some bone



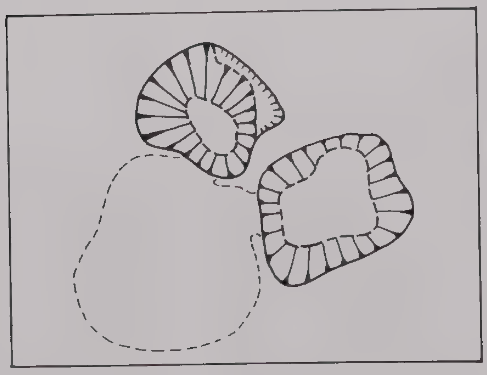
Iron Age / Early Roman II

289	Pit [800]	Iron Age pottery



Late First/Second Century

277	Pit [326]	First to second century pottery, 7% wheel made; and some bone
286	Pit [326]	First to second century pottery, 7% wheel made; and some bone
296	Pit [327]	First to second century pottery
281	Pit [800]	Hadrianic to Antonine pottery; some slag and flint



Illus. 7.10 *Hawling Road. Phasing of pit burial and pit cluster c. 249E, 396N*

	IA	IA	IA	C1	C1	C1	C1	LC1	EC2	LC1	LC1	LC1	?	LC1-EC2	E C2	MC2	EC2-MC2	C2
	510	4037	4031	4032	500	4017	1017	533	1133	286	277	4006	4000	547	4007	4014	4030	4023
G01	65.8	86.8	77.7	34.4	15.3	45.3	18.1	75.0	2.3	.	.	23.9	5.9	32.1	12.4	33.3	15.9	1.8
G096	21.1	.	1.2	6.3	32.2	3.1	6.9	.	.	.	.	.	19.6	1.8	1.4	.	.	1.8
G25	7.9	.	.	.	4.7	7.8	7.4	3.1	50.6	12.5	7.3	15.2	21.6	21.4	38.8	10.3	20.6	39.3
G28	5.3	4.4	4.6	18.8	17.9	15.6	5.6	6.3	4.5	.	3.1	.	23.5	12.5	5.6	12.8	11.1	12.5
G291	.	1.4	0.3	.	.	3.1	.	.	.	.	.	.	.	.	.	.	3.2	.
G32	.	7.4	0.3	.	.	.	.	6.3	3.4	.	2.1	.	.	.	.	2.6	.	.
G03	.	.	0.9	.	1.0	.	.	.	.	.	.	.	2.0	.	4.2	.	3.2	7.1
R11	.	.	0.3	6.3	.	.	11.1	.	2.3	2.8	2.1	2.2	.	.	7.6	12.8	4.8	1.8
G14	.	.	0.3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
G093	.	.	1.5	.	14.3	.	.	.	.	.	.	2.2	.	1.8	.	.	.	.
G29	.	.	1.2	12.5	3.7	14.1	5.6	.	4.5	72.2	77.1	21.7	.	19.6	15.8	5.1	26.9	23.2
G07	.	.	4.3	3.1	1.3	.	1.4	.	1.1	.	.	.	2.0	.	4.8	.	1.6	.
G293	.	.	4.9	9.4	0.7	4.7	1.4	.	.	.	.	.	.	.		.	6.3	8.9
G41	.	.	0.3	.	.	.	.	.	.	.	.	.	.	3.6	.	.	.	.
G097	.	.	1.5	3.1	.	.	2.8	.	.	.	.	.	.	.	.	2.6	.	1.8
G52	.	.	0.3	.	.	.	12.5	.	3.4	.	.	.	.	1.8	0.3	.	.	.
G25	.	.	0.3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
G33	.	.	.	12.5	0.3	3.1	8.3	.	.	.	1.0	10.9	7.8	1.8	2.0	2.6	.	.
G294	.	.	.	.	8.3	.	1.4	.	.	.	.	.	.	.	0.3	2.6	.	.
R35	.	.	.	.	0.3	.	1.4	3.1	.	.	.	.	.	.	0.3	.	.	.
G101	.	.	.	.	.	1.6	1.4	.	.	.	.	.	.	.	0.3	2.6	.	1.8
R06	.	.	.	.	.	1.6	.	.	.	.	.	.	.	.	.	.	.	.
R19	.	.	.	.	.	.	2.8	.	2.3	.	.	.	.	1.8	.	.	.	.
R06	.	.	.	.	.	.	1.4	.	.	.	.	.	.	.	.	.	1.6	.
R18	.	.	.	.	.	.	8.3	.	7.9	1.4	.	.	.	.	0.3	.	.	.
R191	.	.	.	.	.	.	.	6.3	1.1	.	.	.	.	.	.	7.7	.	.
R34	.	.	.	.	.	.	.	.	16.9	.	.	.	.	.	0.3	.	.	.
G101	.	.	.	.	.	.	.	.	.	1.4	3.1	.	.	.	.	2.6	.	.
M091	.	.	.	.	.	.	.	.	.	1.4	.	.	.	.	.	.	.	.
G091	.	.	.	.	.	.	.	.	.	9.7	3.1	.	.	.	.	.	.	.
R194	.	.	.	.	.	.	.	.	.	.	1.0	.	.	.	.	.	.	.
G60	.	.	.	.	.	.	.	.	.	.	.	17.4	.	.	2.0	.	1.6	.
G27	.	.	.	.	.	.	.	.	.	.	.	2.2	.	.	0.3	.	.	.
G90	.	.	.	.	.	.	.	.	.	.	.	2.2	.	.	.	.	.	.
R11	.	.	.	.	.	.	.	.	.	.	.	.	11.8	.	.	.	.	.
W30	.	.	.	.	.	.	.	.	.	.	.	.	2.0	.	.	.	.	.
O26	.	.	.	.	.	.	.	.	.	.	.	.	2.0	.	.	.	.	.
O16	.	.	.	.	.	.	.	.	.	.	.	.	2.0	.	.	.	.	.
M15	.	.	.	.	.	.	.	.	.	.	.	.	.	1.8	.	.	.	.
R24	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.3	.	.	.
G092	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.7	.	.	.
G102	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.4	.	.	.
R38	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2.6	.	.
R10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3.2	.
n	38	68	328	32	301	64	72	32	89	72	96	46	51	56	355	39	63	56
%WM	-	-	-	-	+	3%	26%	9%	30%	7%	7%	2%	15%	3%	11%	27%	10%	3%

Illus. 7.11 *Hawling Road. The pottery fabric proportions by sherd numbers from the groups in their chronological order*

Table 7.2

Hawling Road. Samian ware (identified by A.C. King)

Context	Production centre	Form	Date	Notes
J8	Les Martres de Veyre	Drag. 18/31	A.D. 100–25	-
K14	Central Gaul	-	Hadrianic onwards	-
A12	Central Gaul	Drag. 18/31 or 31	Hadrianic onwards	-
4	Central Gaul	footring base	Hadrianic onwards	Much mica
17	Central Gaul	Drag. 18/31 or 31	Hadrianic onwards	-

forts and towns, at first sight suggests a remarkable degree of 'Romanization' of assemblages. This tends not to be borne out by the other components of the rural assemblages. Rather than reflecting the use of Romanized food preparation methods and recipes, the presence of mortaria probably indicates some existing usage to which this particular type of vessel was well suited. It seems unlikely that this problem will be resolved until serious and well designed research is undertaken on food residues in these vessels.

Fabric G25 seems to appear in the first century, but generally at a level of less than 10 percent, but it becomes of major importance in the early second century when it comprises 20-50 percent of the assemblages. The Roman fabric assemblage forms an interesting contrast with that at the neighbouring roadside settlement of Shiptonthorpe in the second century, as the common wheel-made fabrics found there (R35 and R34) are almost absent. Indeed the contrast in assemblages between Hawling Road and Shiptonthorpe seems to suggest that at this time there was little integration in the supply between at least some rural sites and their nearest market centre.

The samian ware

by A. C. King

Only five sherds of samian ware were recovered from the site (Table 7.2), three from the gridded field-walking programme and two from the unstratified material from the excavated area. None was recovered stratified in the excavations. The quantity of samian from the site is clearly very low. As a proportion of the material dated to the first and second centuries in the gridded field-walking material (Illus. 7.11) it amounts to 1.4 percent and this is certainly an overestimate as coarse wares which might have been of this date, but could not definitely be assigned to it, were excluded from the plot. This quantity of samian is very low compared with military sites (eg. Segontium fort (King and Millett 1993) with around 10 percent) and towns (eg. Catterick (Dickinson in Bell and Evans *forthcoming*) around 10 percent), although comparable with the maximum of 1.5 percent from the southern rural site at Worberry Gate, Somerset (Evans *forthcoming* a).

It is of note that despite continuous occupation on the site from the Iron Age, the samian list does not include any South Gaulish material although there is a piece of the rarer Les Martres-de-Veyre fabric. Clearly the pattern of 'Romanization' in the use of ceramics is different here from that on rural sites in north Wales, where settlements of apparently higher and lower status acquired samian before they received any other Roman ceramics and where decorated material is disproportionately represented on high status sites (Evans *forthcoming* b and e).

Animal bone report

by A. C. King

A small assemblage of 275 bones was examined from the excavation, together with thirteen from the field-walking. All were in a poor state of preservation due to the soil conditions. It was apparent that these had also caused destruction of bone, since a high proportion of the count consisted of teeth, except in the case of sheep/goat (Table 7.6), indicating that small fragments and porous bone had probably eroded away completely. Supporting data for this came from examining the bone:pottery ratios (Table 7.3). These ratios vary markedly and many are very low. The higher figures from 277, 286, 510, 531 and 533 are more in line with those found on other sites, although still on the low side, but the variability and low figures seem to strongly suggest that the gravel and

Table 7.3

Hawling Road. Pottery:bone ratios from the larger groups

Context	Ratio	Date
4031	1:0.06	Iron Age
4037	1:0.00	Iron Age
510	1:0.32	Iron Age
4000	1:0.02	first century?
4017	1:0.06	first century?
1017	1:0.14	first century?
4006	1:0.15	first century
500	1:0.02	first century
1133	1:0.01	early Roman
4023	1:0.00	early Roman
286	1:0.48	first–second century
277	1:0.30	first–second century
4014	1:0.00	first–second century
4007	>1:0.01	early second century
533	1:0.56	Flavian
547	1:0.00	Flavian to Trajanic
4030	1:0.00	Hadrianic to Antonine

Table 7.4

Hawling Road. Number of fragments of bone from stratified contexts by phase

Phase	Cow	Sheep/goat	Pig	Horse	Hare	Vertebrae	Ribs	Large frag.	Small frag.
I Prehistoric	-	-	-	4	-	-	-	-	-
II Iron Age	1	7	1	3	2	9	2	2	6
III First century	5	5	-	1	-	2	-	-	4
IV First–second century	3	7	-	5	-	17	17	9	9
V Mid fourth century	64*	-	-	-	-	20	1	9	-

* Includes 63 bones and teeth from a partial skeleton (see Table 7.12)

sand subsoil was reasonably acidic and that much animal bone has been lost through post-depositional decay.

This factor means that the relative proportions of different species are unreliable for comparison, so that few conclusions can be drawn.

The results are presented in tabular form. Table 7.4 gives the number of fragments from stratified contexts by phase. Table 7.5 the same by area. Table 7.6 tooth:bone ratios by species and Table 7.7 the bone measurements.

The main conclusion to be drawn is that the zones from which the bones came seem to have had a strong effect on the species present, regardless of phase (Table 7.5). If the later cow skeleton is disregarded (below Section 7.4.3), it can be seen that the only significant numbers of cattle bones come from 310-330E, an area of boundary ditches. The majority of the sheep/goat bones, however, came from 350-370E, the eastern enclosure. Whilst it is possible that there was a long lasting zonation of activity on the site from the Iron Age into the early Roman period, the numbers mean that this can only be a very tentative hypothesis on the bone evidence alone.

Hawling Road is likely to have been a producer site in agricultural terms, possibly supplying consuming sites like the nearby fort at Hayton, which was in existence during the later first century A.D. The bone numbers from Hawling Road hardly represent material worthy of comparison with Hayton, but overall there are similarities in the assemblages (cf. Monk 1978), with the exception of a slightly higher representation of sheep at Hawling Road. Hayton seems to have been a military site that relied on local meat sources, and only bent supply to a limited extent to fit the beef-dominated military meat diet that emerged more strongly later as a feature of army garrisons in Britain (King 1991, 16).

Iron nails

by Jeremy Evans

The absence of nails from all of the Iron Age and early Roman contexts does seem remarkable (especially given the metal detecting coverage and sieving of all pit and post hole fills), although comparative data are not easily available as this class of find is rarely fully tabulated. Rural sites such as

Table 7.5

Hawling Road. Numbers of fragments of bone from stratified contexts by area

Area	Phase	Cow	Sheep /goat	Pig	Horse	Hare	Vertebrae	Ribs	Large frag.	Small frag.
250E	III	-	-	-	-	-	2	-	-	-
	IV	-	-	-	4	-	17	17	6	1
280E	III	-	2	-	-	-	-	-	-	1
	IV	-	-	-	1	-	-	-	1	1
	V	64*	-	-	-	-	20	1	9	-
310 –320E	III	4	1	-	1	-	-	-	-	-
	IV	3	-	-	-	-	-	-	-	-
350 –370E	I	-	-	-	4	-	-	-	-	-
	II	1	7	1	3	2	9	2	2	6
	III	1	2	-	-	-	-	-	-	3
	IV	-	7	-	-	-	-	-	2	7

* Includes 63 bones and teeth from a partial skeleton (see Table 7.12)

Table 7.6

Hawling Road. Tooth:bone ratios, excluding the fourth-century cow skeleton, but including unstratified material

	Cow	Sheep/goat	Horse	Pig
Teeth	1:17	1:6	1:9	1:2
Bones	1:6	1:21	1:8	1:0

Elsted, West Sussex (Redknap and Millett 1980) or Ower, Dorset (Sunter and Woodward 1987) in the lowland zone produce nails in quite reasonable quantities. On highland zone sites such as Graeanog, Gwynedd (Kelly *forthcoming*) or Milking Gap, Northumberland (Kilbride-Jones 1938b) in contrast there do seem to be fewer. In the Yorkshire area the Iron Age and Roman enclosures on Levisham Moor also appears to lack nails (Hayes 1983, 33), as do the six Iron Age round houses excavated at Roxby (Inman *et al.* 1985), despite there being evidence of iron smelting activity on both sites. Similarly the Romano-British hut site at Staden near Buxton, Derbyshire also lacks nails (Makepeace 1983). It would seem likely that nails were probably little used and perhaps iron was valuable enough to have been re-cycled.

Iron slag

by Jeremy Evans

A certain amount of iron slag has been recovered from the site, including two from first-century contexts, one (33g) from 4032, the other (106g) from the context 500, both at the east end of the site, east of 350E, possibly suggesting some iron-working in the vicinity at this date (Table 7.9). The most significant piece of slag was a furnace bottom from post hole 600 (235E, 389N), clearly suggesting iron-working, although there is no dating evidence for the feature. Table 7.8 lists the slag from across the site, most being concentrated between 210E and 310E with a further concentration between 350E and 380E (Illus. 7.12) suggesting the possibility of some Iron Age or Roman iron-working in this area.

Loom weights

by Jeremy Evans

The baked clay loom weights are all fragmentary, but many have remains of surfaces and several have the circular perforations 7-14mm in diameter. They are generally organically tempered and seem to have been of the usual form, sub-triangular with a perforation at the top (Illus. 7.13; cf. Brewster 1963, fig. 73). The distribution of the loom weight fragments (Table 7.10) was predominantly towards the eastern side of the site, concentrated in the area of the Iron Age features from 350E and from the Iron Age and early Roman ditches in 310-320E. They do not seem to have been confined or concentrated in features of Iron Age date, but rather equally spread throughout Iron Age to second-century features in the eastern part of the site. There was a notable lack of loom weight fragments from the ditches in 280-290E; features where wheel-made fabrics were concentrated in the Roman features and hand-made fabrics are consequently less important here than elsewhere on the site. This may again hint at some spatial organization of activities on the site, with a more domestic area around 280-290E and weaving and cooking/heating activity further east.

Burnt stone

by Jeremy Evans

The distribution of burnt stone (Table 7.11) shows a similar picture with the main concentrations being between 310-320E and 360-370E, the former being the larger. Again there is little concentration of burnt stone in 380-390E where the pottery shows a greater emphasis on wheel-made fabrics, suggesting spatial organization of the use of stone for some sort of heating or cooking. As with the loom weights there is no suggestion that the use of stone in cooking/heating was an Iron Age practice which declined in the Roman period, although this would seem to be the case generally.

Table 7.7

Hawling Road. Bone measurements (using von den Driesch's (1976) system)

Horse pelvis	LA61 LAR55 (Phase IV)
Sheep/goat	1st posterior phalanx GLpe 29 Bp 8 SD 6 Bd 8 2nd posterior phalanx GL 18 Bp 8 SD 6 Bd 7 Articulated (Phase IV)

Table 7.8

Hawling Road. The distribution of slag over the excavated site

Topsoil zone	Slag number	weight (g)
210-20E	2	30
220-30E	6	125
230-40E	8	402
240-50E	2	153
250-60E	1	37
260-70E	0	0
270-80E	4	150
280-90E	1	62
290-300E	0	0
300-10E	3	93
310-20E	1	3
320-30E	0	0
330-40E	0	0
340-50E	0	0
350-60E	1	33
360-70E	2	119
370-80E	8	183

Table 7.9

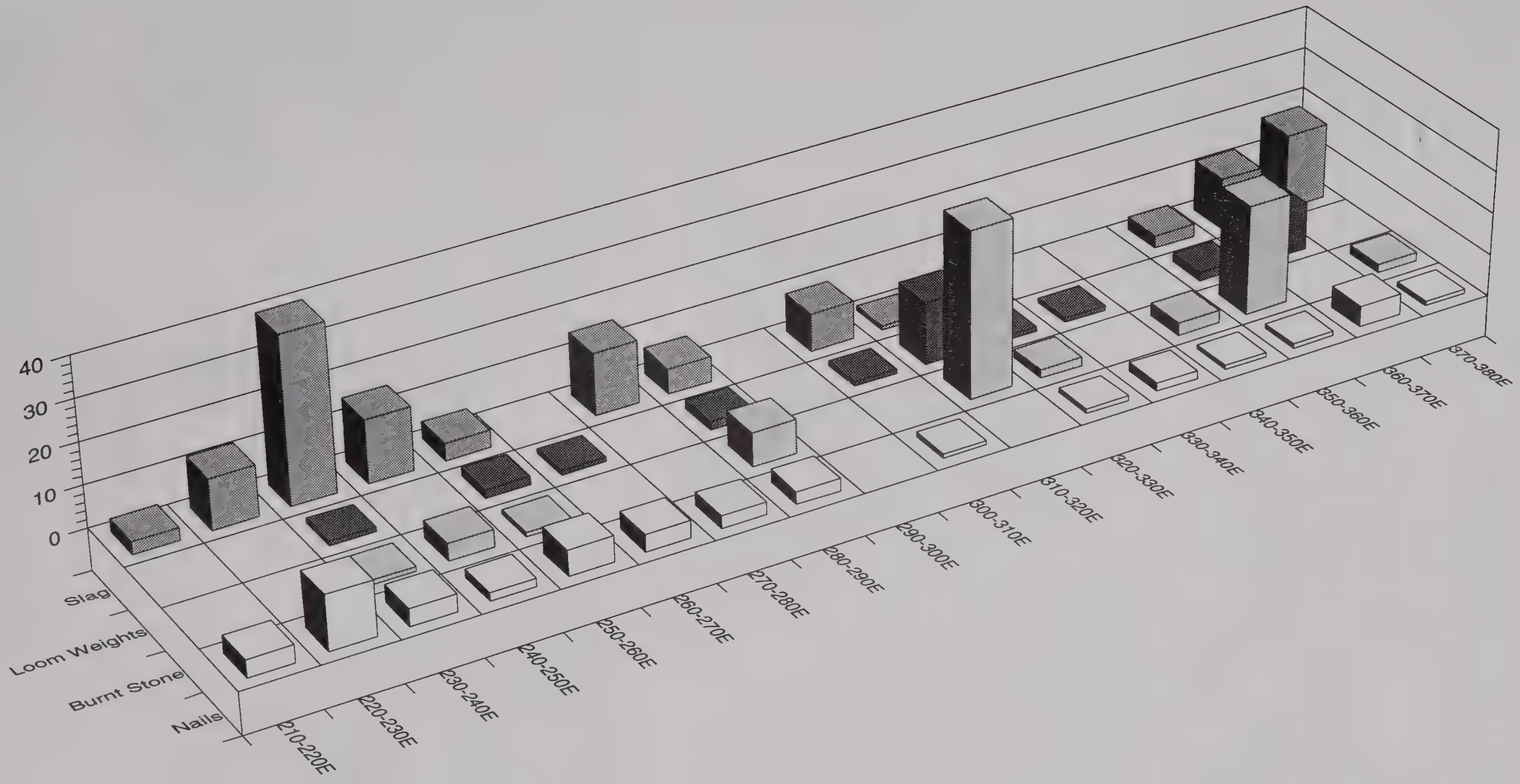
Hawling Road. All stratified slag (sorted from west to east)

Context and Location		Description	Dating	Weight	Comments
82	222E, 393N	Post hole [192]	-	4.0g	-
53	228E, 392N	Post hole [147]	-	8.0g	-
158	229E, 401N	Post hole [638]	-	13.0g	-
158	229E, 401N	Post hole [638]	-	8.0g	-
178	234E, 400N	Post hole [646]	Mid third century.	12.0g	-
49	234E, 389N	Post hole [153]	-	19.0g	-
50	235E, 389N	Post hole [600]	-	100.0g	Furnace bottom
50	235E, 389N	Post hole [600]	-	215.0g	-
444	244E, 395N	Post hole [805]	-	117.0g	-
281	248E, 396N	Post hole [800]	Second century	36.0g	-
003	319E, 390N	'Hearth'	Second century	3.0g	-
032	351E, 399N	Gully [4033]	First century	33.0g	-
500	367E, 393N	Gully [518]	First century	106.0g	-

Table 7.10

Hawling Road. List of loom-weight fragments from the excavated trench (sorted east to west)

Context and Location		Description	Dating	Number	Weight	Comments
283	250E, 396N	Surface clearance	-	2	4g	Possibly daub
268	252E, 395N	Post hole [562]	-	2	26g	Possibly daub
425	261E, 400N	Post Hole [791]	-	1	8g	Possibly daub
1017	281E/400N – 286E/390N	Ditch [1134]	first–early second	2	12g	-
28	300-310E, 390–400N	Surface clearance	-	2	37g	Possibly daub
4000	310E/400N –316E/406N	Gully [4008]	-	19	79g	-
4007	311E/400N – 316E/395N	Gully [4008]	early second	4	181g	-
4013	312E, 391N	Gully [4014]	first–second	7	191g	-
4009	314E, 395N	Gully [4014]	first–second	1	50g	-
4011	315E, 396N	Gully [4014/4018]	first–second	4	672g	loom weight
4004	315E/400N – 321E/396N	Gully [4005]	-	1	22g	-
-	317E, 397N	Surface clearance	-	3	10g	
4003	319E, 390N	Burnt area	-	4	100g	Circular hole, loom weight
4006	320E, 395N	Gully [4002]	first	3	30g	-
101	320–325E, 395–400N	Surface clearance	-	1	73g	-
39	335–340E, 390–395N	Surface clearance	-	1	2g	Possibly daub
512	362E, 394N	Post hole [535]	-	1	10g	Possibly daub
513	363E, 394N	Gully [524]	-	1	27g	Possibly daub
510	364E, 395N	Dark spread	Iron Age	1	2g	Possibly daub
4031	370E, 400N	Pit [4039]	Iron Age	9	116g	
O16		Fieldwalking find	-	3	186g	Circular hole, loom weight



Illus. 7.12 *Hawling Road. The distribution of slag, loom weights, burnt stone and nails*

Early Roman coins

None came from the excavation or field-walking, although a *sestertius* of Hadrian was found by metal detectorists.

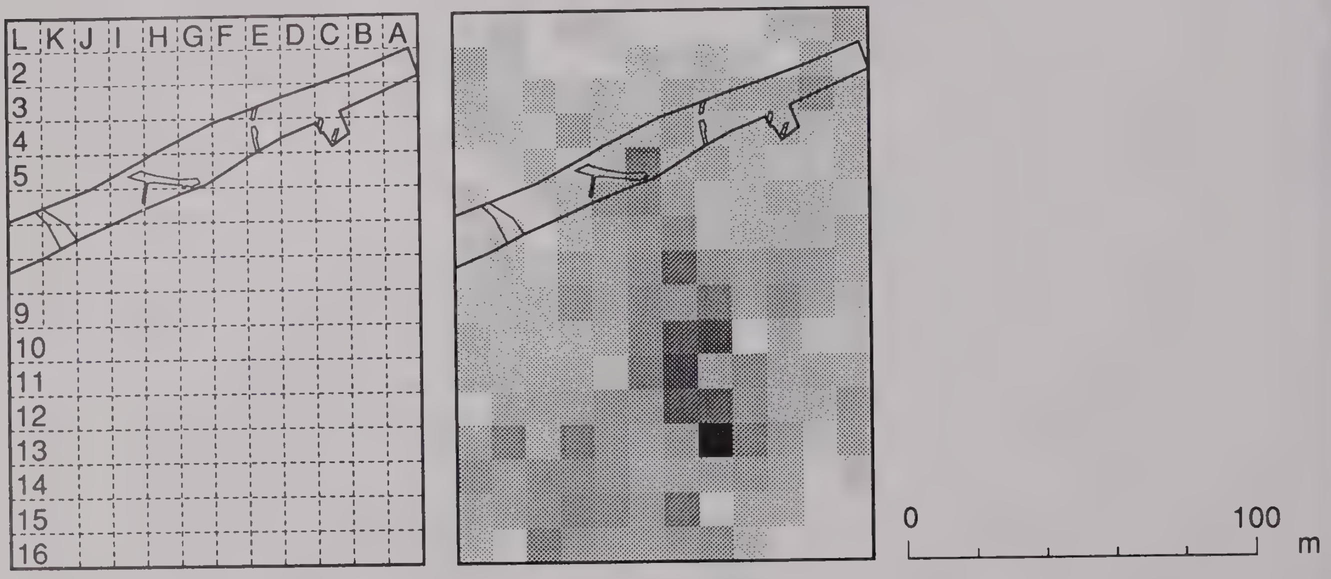
Carbonized seeds

by Jacqui Huntley

Twenty-five samples were subjected to manual flotation. Residues were sieved to 1mm and flots collected in 500µm mesh sieves. After drying, both flots and residues were sorted for biological remains. The site was well-drained and therefore any preservation of botanical material, contemporary with Iron Age or Roman occupation, was likely to have been by carbonization.

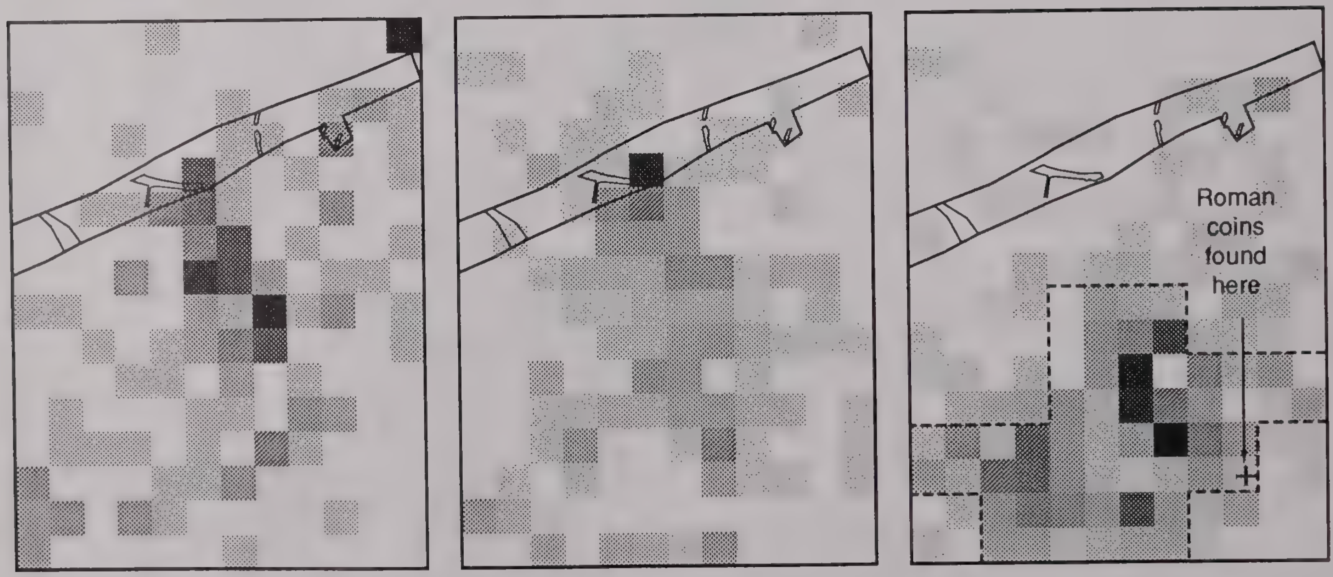
Fifteen flots were examined in detail. All of the samples contained large amounts of fine, modern rootlets as a result of the relatively shallow excavations. In addition, most contained large numbers of modern seeds, particularly of *Chenopodiaceae*. Also quantities of flax seeds and capsule fragments were recovered (Flax, *Linum usitatissimum*, was the crop being cultivated in the field at the time of the excavation).

Of the archaeological plant material little may be said. Wheat and barley were both found. The wheat was probably mainly spelt although only one grain was reasonably securely identified. Wheat grains are not easily identified to species



Field Walking Grid

All Pottery



Iron Age Pottery

Early Roman Pottery

Later Roman Pottery

Illus. 7.13 *Hawling Road. Gridded field-walking finds: (a) the sampling grid, (b) all pottery, (c) Iron Age pottery (maximum = 9 sherds), (d) first and second-century pottery (maximum = 17 sherds), (e)third and fourth-century pottery (maximum = 32 sherds)*

Table 7.11

Hawling Road. List of stratified burnt stone (ordered west to east)

Context		Feature	Date	Number	Weight
83	238E, 397N	Posthole [607]	first–second	1	4g
296	251E, 397N	Pit [362]	first–second	1	47g
238	256E, 396N	Post hole [689]	Medieval	1	3g
1133	281E/400N – 286E/390N	Ditch [1134]	first–second	5	360g
1105	283E/400N – 289E/390N	Ditch [1106]	Flavian	3	370g
4007	311E/400N – 316E/395N	Gully [4008]	early second	15	2758g
4013	312E, 391N	Gully [4014]	first–second	9	1247g
4012	314–320E, 390–394N	Medieval furrow	-	1	25g
4017	315E, 396N	Gully [4018]	first	9	384g
4011	315E, 396N	Gully [4014/4018]	first–second.	5	1154g
4004	315E/400N – 321E/396N	Gully [4005]	-	1	6g
4003	319E, 390N	Burnt area	-	1	2g
101	320–325E, 395–400N	Clearance	-	2	56g
547	348–350E, 390–400N	Ditch [548]	late first – early second	3	112g
4032	351E, 399N	Gully [4033]	-	1	15g
512	362E, 394N	Post hole [535]	-	2	165g
510	364E, 395N	Spread	Iron Age	3	200g
533	364E, 394N	Post hole [534]	Flavian	5	80g
500	367E, 393N	Gully [518]	first	13	1414g
4037	368E, 397N	Pit [4038]	Iron Age	1	153g
503	368–370E, 386N	Gully [527]	first–second	2	35g
4031	370E, 400N	Pit [4039]	Iron Age	2	26g
531	395E, 360N	Pit [532]	Iron Age	1	78g

and chaff is required to confirm such specific identification, none was found from these samples. Barley was recovered and some of the grains showed the characteristic ridging and persistence of glumes of the hulled barley. None of the grains was well-enough preserved to determine whether we are looking at 6-row or 2-row barley. Oat grains were found although they may have been growing as weeds amongst the other cereals rather than as a crop in their own right. Very few weed seeds were recovered, the few are indicators of a variety of local soil conditions.

The lack of material is disappointing and may be the result of a genuine scarcity of burnt remains in the area or may simply be that the zone specific to 'botanical activity' was not in the area excavated. The remains give us the simple indication that both wheat and hulled barley, and possibly oats, were being used in the first century A.D.

The Iron Age and early Roman site: Discussion

One common theme comes through the evidence analyzed, that of zonation of activity across the site. Loom weights, iron-working debris, quantities and types of pottery, even the presence/absence of archaeological features, all seem to have strong spatial trends determined by the enclosure boundaries which cut across the excavated area. For convenience the main spatial trends have been summarized on the phase plan (Illus. 7.4) where the distribution of the small finds and bones has been indicated along the bottom. Unfortunately the nature of the By-pass excavation, being a long thin strip through the site, means that an overall interpretation of the settlement is impossible. Nonetheless the data may indicate the long term structured use of space, with the function of each area maintained over generations.

The evidence of the later Iron Age and early Roman excavation can, however, be taken further. Significant changes occurred between the early and later Roman periods. The concentration of settlement shifted to the south and the nature of the material culture, particularly the ceramics altered. It is to these changes that our attention now turns.

7.4.3 The later Roman occupation

Later Roman changes

Evidence for occupation within the excavated area decreased after the second century. All of the enclosure ditches had become infilled by the later second century. Even unstratified material was negligible except in areas 270-80E and 300-10E (cf. Illus. 7.6). The main reason for this is less a reduction in the scale of occupation than a shift in the central focus of the settlement to the south, indicated by changes in the distribution of the surface survey material.

The only significant feature from the excavated area was a pit containing the unbutchered remains of a cow. A comment should be made about the skeleton. It is the only late Roman deposit from the excavation, and despite the partial state on recovery it appears to have been an unbutchered burial (Table 7.12). Such burials are not uncommon in the Roman period and a question inevitably arises as to the circumstances behind it. A sacrifice seems unlikely, since, in the classical world at least, sacrificial animals were generally dismembered and eaten, because they were a rare and valuable source of meat[1]. Burial of a diseased animal seems a more likely reason, and it is unfortunate that the poor state of preservation sheds no light on potential pathological changes to the bones. It must be said, however, that the disease, if it was the cause of death, also prevented dismemberment and consumption of the meat. This may have represented a significant loss to a relatively poor agricultural community.

The settlement shift: an introduction to the field-walked pottery

by Jeremy Evans

Illus. 7.14 and Illus. 7.15 show the results of the gridded field-walking exercise over the field prior to excavation. The field was walked in 192 10m by 10m squares. An attempt has been made to divide all the material from this into broad chronological groupings, namely Iron Age, first to second century, third to fourth century, medieval and post-medieval. Owing to the large number of hand-made fabrics of Iron Age style which were current in the first to second centuries A.D. difficulty has been encountered in separating Iron Age from early Roman material and the results probably reflect this (fabrics designated as Iron Age for this purpose are G01, G03, G096, G28, G32, G293 and G52).

The distribution of apparently Iron Age material is generally concentrated around the centre of the field with a trail running off to the south-west and to a lesser extent to the north-east. First to second-century material has a similar though more extensive distribution from that of the Iron Age, again with a main concentration in the centre of the field, but on more of a north-south axis, stretching down towards the south of the field.

The later Roman material by contrast shows a marked change from the above two plots with a large quantity of material being concentrated throughout the southern half of the field, but with little in the centre and nothing in the northern half.

In order to compare and contrast material from the late Roman successor in the south of the field with the excavated Iron Age and Roman site, the field-walked material has been examined in some detail. Illus. 7.15 focuses on the later Roman site in the southern half of the field. These distributions are of individual fabric types as a percentage of all Roman and Iron Age material in blocks of four adjacent squares (this being done to accumulate enough sherds for percentages to be usable; the core area is shown in Illus. 7.14).

The first illustration shows the distribution of the Iron Age material (defined by the same range of fabrics as above, though excluding calcite gritted fabric G01, which is probably mainly later Roman). As with the overall field plot there is a presence over the entire area, though this does tail off towards the south and east. Illus. 7.15B plots the distributions of samian ware and fabrics R35, G25 and R18, all of which are probably of first- or second-century date. These seem to be sufficient to give an indication of early Roman occupation in this area

Separating later third-century material from the general spread of later Roman material is somewhat problematic, the best marker is probably the spread of fabric G101, the Holme-on-Spalding Moor gritted ware fabric, although it is never common. Illus. 7.15C plots the distribution of this fabric, the results are not very clear, but seem to suggest that it extended across the whole of the area defined as the site. The general spread of later third- to mid fourth-century material is shown by Illus. 7.15D which plots the distribution of definite Holme-on-Spalding Moor greyware (fabric R07) covering the whole of the site. Illus. 7.15E plots the distribution of Crambeck wares (fabrics F70 and R09). These must cover a date range of *c.* A.D. 285-400+, but most probably represent activity in the later fourth century when the Holme-on-Spalding Moor industry was in a marked decline (Evans 1985). As is the case at Brough-on-Humber, Crambeck parchment wares are only slightly less common than the greywares, whilst the forms represented in Crambeck fabrics are two parchment ware mortaria, a greyware bowl and three greyware dishes. The frequency of Crambeck dishes here, as at Brough, no doubt reflects the fact that dishes were rarely produced by the Holme industry. The distribution of Crambeck material (Illus. 7.15E) gives some indication of the area occupied in the later fourth century whilst Illus. 7.15F shows the occurrence of forms, in the same grid blocks, which may be confidently assigned to this period. Both of these distributions suggest that occupation had contracted along the west of the gravel ridge and perhaps to the north.

The fabric figures from the site suggest that in the later third to mid fourth century, and probably beyond, supply was dominated by Holme greywares, as might be expected given the proximity of the kiln sites. It is interesting that as on sites further afield, Holme gritted wares seem to make a very low contribution to fabric supply, in contrast to the material from the Hasholme and Bursea kiln sites. The second most important fabric type was calcite gritted ware (fabric G01) with a form assemblage mainly composed of fourth-century types; S-bend, proto-Huntcliff and Huntcliff-type jars, with only an

Footnote

[1] It should be noted that the nearby excavations at Shiptonthorpe and Hayton have now produced significant numbers of similar animal and infant burials. Consideration of the patterns of deposition strongly suggest that these were carefully deposited with religious motives

occasional third-century (or earlier) Knapton or related type (Illus. 7.15G). Nine of the nineteen calcite gritted ware forms are of Huntcliff-type jars, no doubt reflecting the increasing occurrence of this fabric type in the later fourth century, which only represents approximately an eighth of the time span over which the later Roman variant of this fabric was in circulation. Also of an importance similar to fabric G01 was the fabric group R11 (Illus. 7.15H). In the context of the material from this site much of the material in this group is probably of sandy and comparatively low-fired Holme-on-Spalding Moor material which is not visually distinctive as Holme material from its fabric. It includes amongst its forms some jars of Holme type (Hicks and Wilson 1975, types 6-8; Corder and Sheppard 1930, no. 88, and nos 90 and 102) and a beaker (Corder and Sheppard 1930, no. 106).

One interesting minor fabric is G091, a gritted, calcareously tempered fabric, in which the bulk of the forms are Dales-type jars, it would seem to be the same as the fabric which supplied a major proportion of the assemblage at Brough in the fourth century (fabric 281 in Evans 1985), and may well originate from the possible kiln site recently excavated at North Cave (Sitch, *pers. comm.*).

Turning from fabric supply to the nature of the assemblage on the late Roman site Table 7.13 gives a functional analysis of the 95 rim sherds from the field-walking collection, a little of the material is Iron Age and early Roman, but the bulk is later Roman.

The assemblage is dominated by jars with a low proportion of dishes and bowls and a very low proportion of beakers and flagons. This composition is fairly typical of rural sites, and it is clear that this was the nature of the late Roman site. The fineware figures bear this out with a mere 1.2 percent of finewares amongst 894 sherds, this figure is well below the level found in forts, towns and villas of the period (Evans 1985; 1993).

The later Roman coins

by Richard Brickstock

As well as ceramics, the field-survey and previous work also resulted in the collection of a number of late Roman coins. The Ordnance Survey indicated that a hoard of Roman coins was discovered in this field in 1843. Alas the hoard was disbanded before adequate details could be recorded. However, recent unauthorized metal-detecting on site has continued to recover coins. During the period of the fieldwork five coins were recovered from one such group of detectorists from Middlesbrough. A further seventeen coins were recovered during the surface survey, and one came from the excavation. Of these twenty-three coins, twenty are late third- and fourth-century Roman (reflecting the date of most of the other field-walking finds).

The Roman coins can be sub-divided into two groups: firstly, there are five coins from the period 256-80 (Valerian; Victorinus [2]; Tetricus I; and a radiate copy). These could conceivably be residual, though the relative lack of wear shown by, in particular, the coins of Victorinus argues against this.

The remaining fifteen, including all five illicitly metal-detected finds, are from the period 337-402. There is the possibility of a scattered hoard amongst them, all three FEL TEMP REPARATIO copies (of the period *c.* 353-58) and two of the three Constantinian copies (produced *c.* 341-46) making up the metal-detected group. However, the field-walked finds bracketed these coins in date, and the total fourth-century assemblage (indeed the assemblage as a whole) makes up a fairly typical list for a fourth-century Romano-British site.

Given the small sample, the over-representation of the mint of Aquileia (two coins of Valens; one SALVS issue of Theodosius) is only a slight surprise: although issues from the mints of Gaul (especially Arles and Lyons) predominate on Romano-British sites at this period, issues of Rome and Aquileia are by no means uncommon, and their occurrence here can be regarded as entirely normal.

Late fourth-century coins are strongly represented, with three coins of Valens (the coins of this eastern Emperor are typically over-represented in comparison with those of Valentinian I, his western counterpart), and two of the House of Theodosius, arguing a continuation of activity right up to the end of the Roman period in Britain consistent with various other sites in the region (eg. York, Malton and Brough).

Catalogue

all identifications are by Richard Brickstock

The following abbreviations are used throughout this catalogue:
mints: Q - Aquileia, AR - Arles, LN - London, LG - Lyons, RM - Rome, TR - Trier

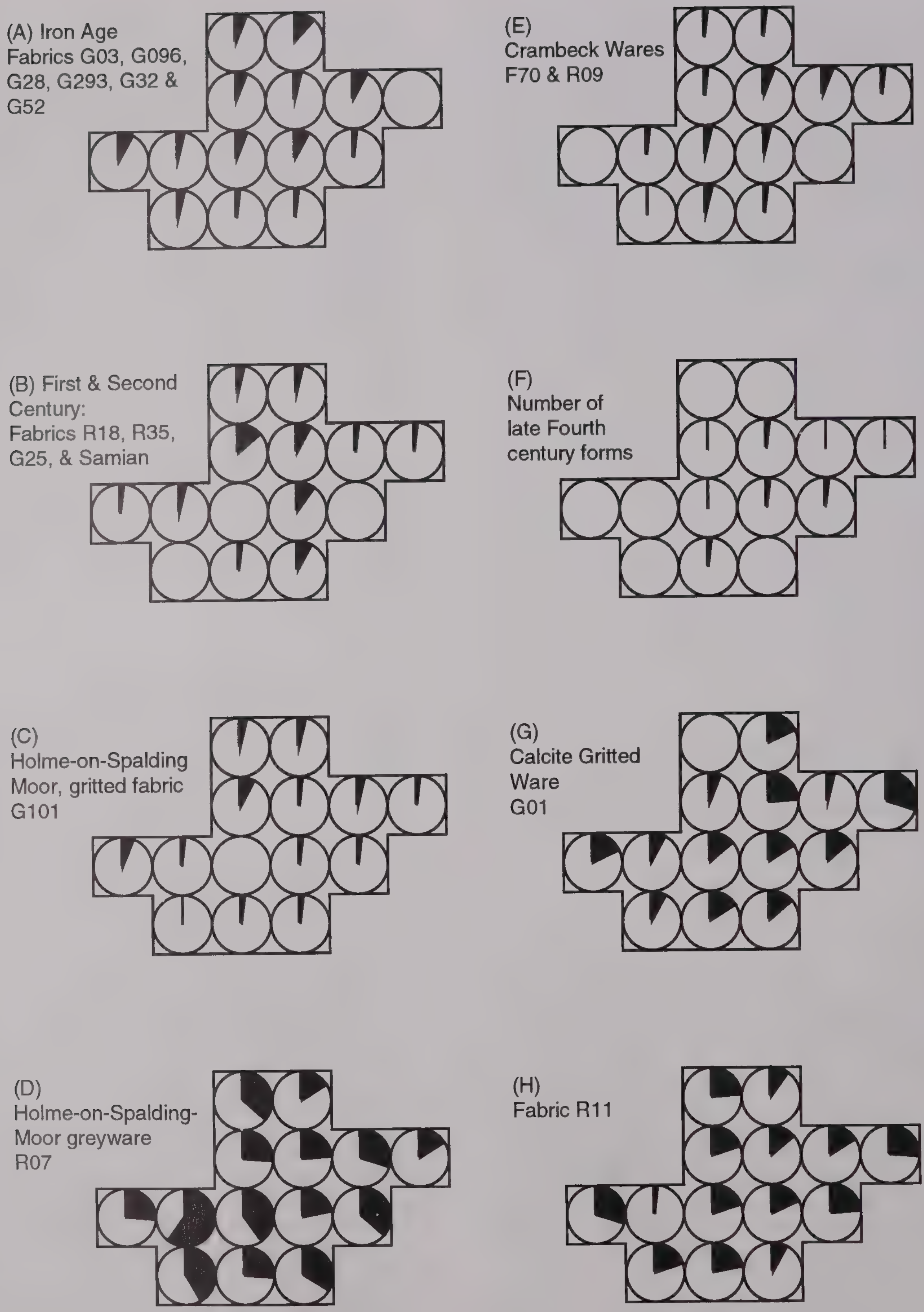
Catalogue [cat:] [numbers refer to RIC unless otherwise stated.]

RIC	*The Roman Imperial Coinage*, volumes 1-9 ed. H. Mattingly, E. A. Sydenham, C. H. V. Sutherland, R. A. G. Carson (1926-81):
CK	*Late Roman Bronze Coinage*, Part II, by R. A. G. Carson and J. P. C. Kent (1960)
E	*Die Munzpragung der Gallischen Kaiser in Köln, Trier und Mailand*, by G. Elmer (1941).
HK	*Late Roman Bronze Coinage*, Part I, by P. V. Hill and J. P. C. Kent (1960)

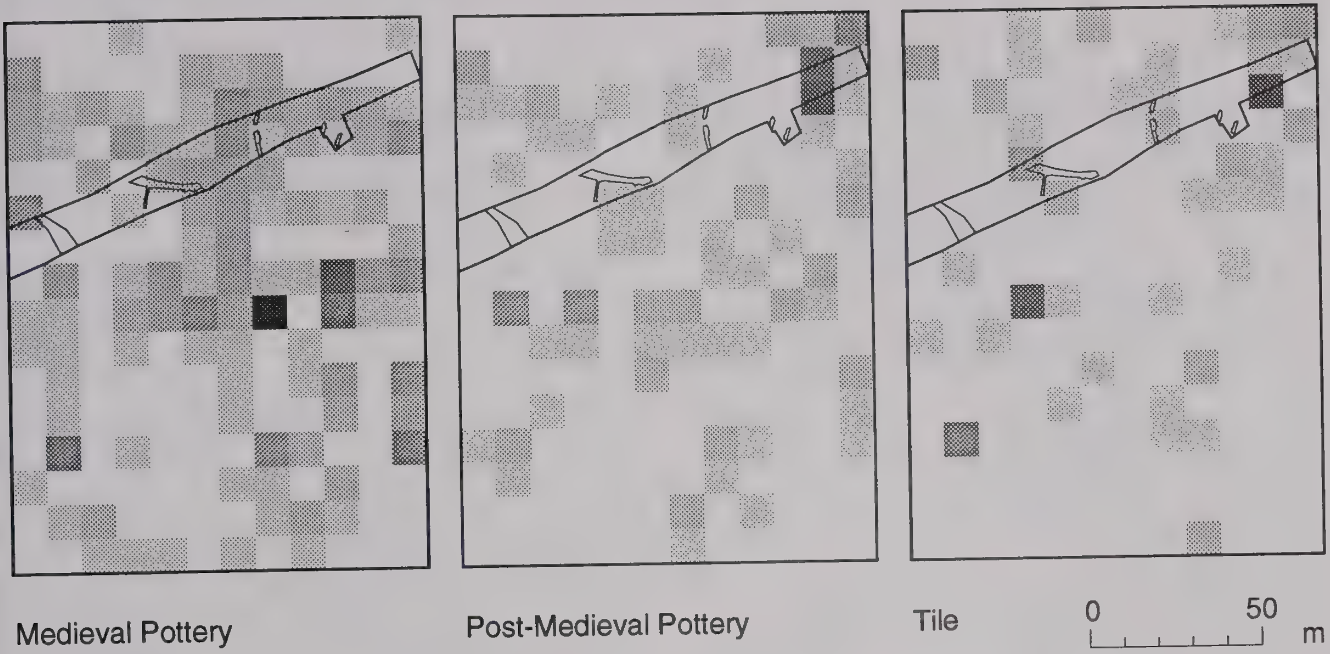
A copy of a counterfeit of a particular ruler/issuer is denoted by single quotation marks, e.g. 'CONSTANTIUS II', and by the use of a lower case 'c.' in the catalogue reference, e.g. c. of 8TR359 - a copy of RIC 8 Trier 359. The use of the word 'of' indicates that a precise catalogue reference has been obtained; 'as' is used, for both official issues and copies, to denote an incompletely catalogued coin.)

Where recorded, the condition [wear:] of both the obverse and reverse is denoted by the following abbreviations: UW - unworn, SW - slightly worn, W - worn, VW - very worn, EW - extremely worn, C - corroded.

The flan diameter [diam:] is given in millimetres [mm] and the weight [wt:] in grams [g].



Illus. 7.14 *Hawling Road. The material from the late Roman pottery scatter: (a) Iron Age material, (b) first and second-century material, (c) Holme-on-Spalding Moor gritted ware fabric, (d) Holme-on-Spalding Moor greyware, (e) Crambeck ware, (f) late fourth-century forms, (g) Calcite gritted ware (G01)*



Illus. 7.15 *Hawling Road. Gridded field-walking finds: (a) medieval pottery (maximum = 9 sherds), (b) post-medieval pottery (maximum = 7 sherds), (c) tile (maximum = 7 fragments)*

Coin List

1	VALERIAN date: 256-57 diam: 20.0 mm	mint: RM wt: 3.0 g	denom: Antoninianus cat: 117 wear:W/W	Obv [IMP C P L]IC VALERIANUS P[F AVG] Rev RES[TITVTOR ORBIS]
2	VICTORINUS date: 268-70 diam: 18.5 mm	mint: - wt: 3.2 g	denom: Antoninianus cat: 114, E.683 wear: SW/W	Obv IM[P C VICTORINVS PFAVG] Rev INVI[CT]VS * in field 1.
3	VICTORINUS date: 268-70 diam: 19.5 mm	mint: - wt: 2.3 g	denom: Antoninianus cat: 78, E.699 wear: SW/SW	Obv [IMP C VICTORINVS PFAVG] Rev [VIRTVS AVG]
4	TETRICUS I date: 270-73 diam: 22.0 mm	mint: - wt: 2.6 g	denom: Antoninianus cat: 99 wear: W/W	Obv [IMP C TETRICUS PF]AVG Rev [ORIENS A]VGG
5	RADIATE COPY date: 273+ diam: 11.5 mm	mint: - wt: 0.5 g	denom: Antoninianus cat: c.as - wear: C/W	Obv - Rev -
6	HOUSE OF CONSTANTINE date: 337-40 diam: 15.0 mm	mint: TR S wt: 1.3 g	denom: - cat: 8TR38-41 wear: W/SW	Obv - Rev GLOR-IA EXERC-ITVS 1 std. +/[TR]S
7	HELENA date: 337-40 diam:13.5 mm	mint: TR S wt:2.1 g	denom: - cat: 8TR55 wear: W/SW	Obv [FL IVL HE-L]ENAE AVG Rev PA[X PV]BLICA [T]RS.
8	'CONSTANTINE I' date: 341-346 diam: 12.5mm	mint: - wt: 0.9 g	denom: - cat: c. as 7LG236 wear: SW/SW	Obv CON[STANTI-NVS MAX AVG] Rev [GLOR-IA EXERC-ITVS] 2 stds. PL[G]
9	'CONSTANTINE II, CAESAR' date: 341-46 diam: 12.0 mm	mint: - wt: 0.7 g	denom: - cat: c. as 7TR586 wear: W/W	Obv CONSTANT[I-NVS IVN NC] Rev [GLOR-IA EXERV-ITVS] 1 std. ?TR-
10	'HOUSE OF CONSTANTINE date: 341-46 diam: 11.5 mm	mint: - wt: 0.6 g	denom: - cat: c. as 7LG275/271 wear: UW/UW	Obv VRBS ROMA Rev GLO[RIA EXERCITVS] 1 std. PLG

Table 7.12

Hawling Road. Cow skeleton from Context 1129; elements present (identification by A.C. King)

- Both mandibles, both maxillae and fragments of the skull, with a total of twenty cheek teeth. The premolars exhibit slightly uneven wear on the left and right sides due to differential chewing action during the animals lifetime
- Seven vertebrae, all probably from the neck end; one rib fragment
- Left scapula, humerus, radius, ulna, carpals
- Right distal humerus and proximal radius
- Right femur and tibia
- Unfused proximal humerus articulation, acctabulum fragment, sacrum fragment

- Total 63 bones, plus 20 vertebral fragments, 1 rib and 9 other fragments all probably from the skeleton
- 1 molar from another individual
- Bone measurements (using Von den Driesch's (1976) system)
  – Cow mandible (8)92 (10)37x13

11 'CONSTANTIUS II' denom: - Obv [DN CONSTANTIVS PFAVG]
date: 353+ mint: - cat: c.as 8TR359 Rev [FEL TEM REPARATIO] FH3
diam: 8.5 mm wt: 0.4 g wear: SW/SW

12 'CONSTANTIUS II' denom: - Obv [DN CONSTANTIVS PFAVG]
date: 353+ mint: - cat: c.as 8TR359 Rev [FEL TEM REPARATIO] FH3
a diam: 11.0 mm wt: 0.6 g wear: C/C

13 'CONSTANTIUS II' denom: - Obv [DN CONSTANTIVS PFAVG]
date: 353+ mint: - cat: c.as 8TR359 Rev [FEL TEM REPARATIO] FH3
diam: 10.0 mm wt: 0.8 g wear: W/SW

14 VALENS denom: - Obv DN VALEN-S PFAVG
date: 364-78 mint: AQ P cat: as CK1012 Rev [GLORIA RO]-MANORVM ?SMAQP?
diam: 18.0 mm wt: 2.3 g wear: W/W

15 HOUSE OF VALENTINIAN denom: - Obv -
date: 364-78 mint: - cat: as CK526 Rev [GLORIA RO-MANORVM]
diam: 17.0 mm wt: 2.2 g wear: C/?SW

16 VALENS denom: - Obv [DN VA]LEN-S PFAVG
date: 367-75 mint: AQ S cat: CK1021 Rev SECVRITAS REIPVBLICAE .SMAQS
diam: 17.0 mm wt: 1.3 g wear: W/W

17 VALENS denom: - Obv [DN V]ALEN-S PFAVG
date: 375 mint: AR P cat: CK528/532 Rev SECVRITAS REIPVBL[ICAE] PCON
diam: 18.0 mm wt: 2.0 g wear: SW/SW

18 THEODOSIUS I denom: - Obv [DN THEODO]-SIVS PFAVG
date: 388-95 mint: AQ S cat: CK1106/9 Rev [SALVS REI-PVB]LICAE AQS
diam: 12.0 mm wt: 1.0 g wear: W/W

19 ARCADIUS (?) denom: - Obv [DN ARCADIV]S PF AVG
date: 388-402 mint: - cat: as CK392 Rev [VICTOR-IA AVGGG]
diam: 13.0 mm wt: 1.1 g wear: ?W/W

20 ILLEGIBLE C4th? denom: - Obv -
date: 330+ mint: - cat: - Rev -
diam: 9.0 mm wt: 0.7 g wear: C/C

Contextual information:

Excavation find:	Coin 15	Context 1015
Gridded surface survey	Coin 10	E12
	Coin 14	F12
	Coin 16	F1
	Coin 18	F12
	Coin 19	G12

	Coin 20 G13
Provisional surface survey	Coins 1-7, 17
Coins recovered from illicit detectorists	Coins 8-13

7.4.4 The Iron Age and Roman site: Discussion

by Jeremy Evans

The majority of the Iron Age and early Roman evidence came from the excavation, whilst the later Roman activity was mainly evidenced by the field-walking scatter. The two sets of evidence are very different, nonetheless comparisons can be made between the two data sets, particularly the ceramics, to try and maximize the amount of information which can be obtained from the material. The following makes a series of detailed comparisons of the material, placing the evidence within a broader knowledge of ceramics within Britain.

Comparisons: sherd size

Table 7.14 lists the average sherd sizes from each of the quantified groups. The highest figures come from 277 and 286, unsurprisingly since they have two fairly complete vessels from them. Otherwise the figures from all the other groups are reasonably high, between 10 and 20g, and similar to groups from 15 northern sites of third to fourth century date (Evans 1985, table 1.3). This may be because of the hand-made fabric types, which fracture into fairly robust sherds compared with wheel-made ones, but even the field-walked material from the late Roman site, which is mainly wheel-made, is generally over 8g.

This makes a contrast with the much more fragmented material found on many rural sites in the highland zone, where pottery use also seems to have been much less common (Table 7.15). It also contrasts with the material from the site of Worberry Gate, Somerset which may be regarded as in some ways intermediate between typical highland zone and lowland zone sites.

Change: function

Table 7.16 shows the function figures for the groups discussed above divided into three approximate chronological blocks, Iron Age, first century and second century in order to generate large enough groups to produce reliable figures for comparison with the material from the field-walking over the later Roman site in the southern half of the field discussed above. It is of note that in the stratified groups the proportion of jars actually rises from the Iron Age until the second century. This is most unusual, the typical pattern is of a declining level of jars from a peak in the Iron Age, for example the sequence from Ructstall's Hill, Basingstoke (Oliver and Applin 1979; Table 7.17). This tends to suggest that in terms of the functional use of vessels there was no 'Romanization' of pottery use on the site in the first and second centuries, although the figures might suggest that this changed a little in the later Roman period.

The function figures do show some of the usual increase in functional diversity in the assemblage, although the absence of flagons and beakers before the third century is of note, as is the absence of amphorae from such large groups, something reflected by the absence of any amphora bodysherds from the stratified groups.

Table 7.18 shows the incidence of deposits on rimsherds and base sherds from the stratified groups, divided into chronological periods as for the function and fabric figures.

The proportion of vessels with external sooted deposits on their rims is very high, almost half of all vessels, suggesting a very high proportion of them was used for cooking/heating. As with the function figures some decline in the proportion from the Iron Age to Roman groups might have been expected, but the reality is slightly the reverse. Few of the vessels have the internal white deposits which have been described here as limescale but may well have some other origin. The proportion of these deposits tends to vary between sites, and no doubt mostly reflects the hardness or otherwise of the water supply. The low proportion here probably suggests a soft water supply and some other origin to the deposits which are found. Whilst the incidence of internal carbonized deposits is not high it is unusual in assemblages of Roman date. The author cannot find comparative figures for the deposits, but the usual level can be taken to be less than one percent. It is also of note that this feature of the assemblage also shows no obvious decline from the Iron Age to the second century, which might be expected. Such deposits are not uncommon on Anglo-Saxon vessels (Evans 1996), but in this they normally show a great contrast to Roman assemblages.

Comparative figures for external sooting on rimsherds from various later Roman sites in the North are presented in Table 7.19.

Figures for sooting and carbonized deposits are not presented for the later Roman field-walked material, because these will no doubt have been eroded in the post-depositional history of this assemblage. The sooting figures in Table 7.19 show quite a variation between sites, but the general level seems to be between 15 and 25 percent with much higher figures from the three late fourth-century groups, from 33 to 52 percent. The latter phenomenon is unsurprising given the much higher proportion of jars, especially cooking pots, often found in late fourth-century groups in the region (Evans 1985; 1993). The Hawling Road figures are much greater than for any of the other sites excepting the Piercebridge ditch group from HS77EX suggesting, as do the site's function figures, a very heavy emphasis on cooking pots. Unfortunately no comparative figures are available from any other rural site in the region. Overall the evidence for the use of vessels on the site suggests a very strong degree of conservatism with very little change from the late Iron Age to the early second century and a very low impact to Romanization. This is a marked contrast to fabric supply where there does seem to be a marked break around the Roman conquest, but a change in sources rather than in the types of fabrics, with the vast bulk of the material still being hand-made and even less of this being decorated than in the Iron Age. In terms of fabric supply the conquest seems to have changed the sources, but not the tradition.

Change: riveting

Three sherds from the stratified groups discussed below (Section 7.6.4) show drilled circular rivet (or suspension) holes, all from context 4007, two on sherds of fabric G29 and one on a sherd of fabric G07. The rate of riveting, at 0.16 percent, is exactly comparable to that at Bainesse Farm, Catterick (Bell and Evans *forthcoming*) and closely similar to the 0.1 percent from Worberry Gate, Somerset (Evans *forthcoming* a). This forms a contrast with the higher rates found on north Welsh rural sites (Evans *forthcoming* b and c) of 0.6 and 2.5 percent, where pottery is a much less frequently used, or available, commodity. Hayes (1983) illustrates two sherds (out of 1671) from the late Iron Age and early Romano-British site at Levisham Moor with drilled holes (fig. 23, nos 70a and 70b) which he describes as suspension holes, were they to be rivet holes this would give a rate of 0.12 percent for this site.

Change: the form assemblage

The form assemblage from the Iron Age to early Roman site to some extent splits into two parts, the hand-made Iron Age tradition fabrics and Roman wheel-made fabrics. The latter group tends to fit into a tradition common to the roadside settlement at Shiptonthorpe, around 2.5km to the north-west, Brough and the wheel-made fabrics at Rudston, which seems to be linked to the ceramic traditions of north Lincolnshire, whilst the Iron Age tradition material has strong links throughout East and North Yorkshire, but almost no links with contemporary Iron Age material in Lincolnshire. The form catalogue shows very few parallels with early Iron Age material, but many with sites throughout East and North Yorkshire of the first century B.C. to the second century A.D.; Stanwick, Rudston, Roxby, Crossgates, Beadlam, Emmotland etc. Material with stamped and rouletted decoration of Lincolnshire type is entirely absent, despite its ubiquity in Lincolnshire (Elsdon and May 1987, 58-59) and the Humber seems to have been a hard boundary to the transmission of material culture at this time (Haselgrove 1984, 15 and note 17) and perhaps into the Roman period (cf. Evans 1988). It is of note that slashing and finger tip decoration, which seems to be rather commoner here than on many sites in the region, is confined to the calcite gritted fabrics and is probably an entirely Iron Age feature, in contrast to Hayes' suggestion (1983, 33) of it continuing well into the Romano-British period.

The change in predominant fabric types from calcite gritted wares in the Iron Age to various other gritted wares in the Roman period does not seem marked by much typological change in the assemblage, apart from the lack of slashed and finger-tip decoration. The commonest form is the vertical, slightly everted rimmed jar (eg. G01-J04), followed by the everted, square-ended, rimmed jar (eg. G01-J02), whilst the bevelled-rimmed small jar (eg. G01-J25; Rigby 1980, no. 1) which seems to date back to the third to second centuries B.C. in East Yorkshire (Brewster 1963, Danes Graves, figs 83-84) also occurs, but much more rarely. The lack of connexion with the Iron Age pottery styles of North Lincolnshire has already been noted, but it is equally true that none of the common 'Belgic' style imports also found at Redcliff (North Ferriby) is found on the site. Indeed that site seems to look far more to north Lincolnshire than it does to East Yorkshire in its ceramic traditions.

The Roman wheel-made pottery assemblage from the site is small, in contrast with neighbouring nucleated sites. It is, however, well tied-in with those at Shiptonthorpe and Brough. Wheel-made forms are frequently in carinated greywares as at Shiptonthorpe and Rudston, and later Holme-on-Spalding Moor wares, the kiln types of which seem to have north Lincolnshire parallels (Swan 1984, 122-24).

The first-century rustic wares are in types similar to Brough, as are the fabrics, very different from the higher fired rustic wares found on late first-century forts such as Binchester in County Durham. From the later third century onwards, on the site in the southern half of the field, Holme forms dominate the assemblage with some contribution from calcite gritted wares, perhaps from the Vale of Pickering.

Pottery discussion

The pottery from Hawling Road provides a useful opportunity to see a series of groups from a rural site extending from the end of the Iron Age to at least the mid second century A.D. It seems that the forms in use on the site changed little in this period, with generally little use of wheel-made Romanized fabrics in the Roman period groups and continuing use of an Iron Age form repertoire in the hand-made fabrics. The function figures and evidence of deposits on vessels from the groups also suggests little change in the way pottery was used on the site and indeed what change there is appears to be an intensification of the Iron Age type pattern, with only the late Roman site showing some alteration to this. The continued use of large proportions of hand-made fabrics of Iron Age tradition would now seem to be the usual pattern on rural sites of the first and second centuries A.D. in East Yorkshire. It is true of the enclosure ditch under the Beadlam villa dating to the mid or later second century A.D. (Evans 1996) and of the enclosure ditches under the Rudston villa (Rigby 1980), the pre-villa enclosure at Langton (Corder and Kirk 1932), and the Roman period enclosure at Levisham Moor (Hayes 1983).

The pottery traditions on these rural sites, dominated by hand-made fabrics in Iron Age potting styles, form a marked contrast with those from contemporary nucleated sites. Pottery from Malton, Brough (Wacher 1969) and Shiptonthorpe (Evans *in prep.*) is predominantly wheel-made. Hawling Road in fact offers a fascinating contrast with Shiptonthorpe,

Table 7.13

Hawling Road. Functional analysis (by minimum numbers of rims per cent) of pottery from the area of the later Roman site

Jars	Bowls	Dishes	Beakers	Mortaria	Flagons	Amphorae	
73.6	10.5	10.5	1.1	3.2	1.1	-	n = 95

Table 7.14

Hawling Road. Average sherd weights of the stratified ceramic groups

Context	Average sherd weight	Context	Average sherd weight
277	22.3g	4006	17.5g
286	24.9g	4007	19.7g
500	13.6g	4014	16.9g
510	10.4g	4017	16.1g
533	20.0g	4023	13.9g
547	15.7g	4030	18.2g
1017	10.3g	4031	11.9g
1133	12.9g	4032	11.9g
4000	15.2g	4037	13.7g

Table 7.15

Hawling Road. Average sherd weights from various Romano-British rural sites

Site	Average sherd weight
Bryn Eryr, Gwynedd	7.0g
Graeanog, Gwynedd	4.3g
Ewan Rigg, Cumbria	9.9g
Worberry Gate, Phase A	8.16g
Worberry Gate, Phase B	6.63g
Worberry Gate, Phase C	5.75g

Table 7.16

Hawling Road. Functional analysis of combined groups from the excavated site and the field-walked later Roman site (by minimum numbers of rims per cent)

Period	Jars	Bowls	Dishes	Mortaria	Lids	Flagons	Beakers	Amphorae	n
Iron Age	75.9	19.0	5.2	-	-	-	-	-	58
First century	89.7	3.4	3.4	1.7	1.7	-	-	-	58
Second century	90.6	5.3	2.7	-	1.3	-	-	-	75
Third–fourth century	73.6	10.5	10.5	3.2	-	1.1	1.1	-	95

Table 7.17

Hawling Road. Functional analysis of vessels from Ructstall's Hill Basingstoke (Oliver and Applin 1979; by minimum numbers of rims per cent)

	Jars	Bowls	Dishes	Mortaria	Lids	Flagons	Beakers	Amphorae	n
Iron Age	85	15	0	0	0	0	0	0	40
IIb Early first century	79	4	4	0	4	0	8	0	24
IIc Late first–early second	67	14	14	0	0	0	5	0	21

Table 7.18

Hawling Road. Percentage incidence of deposits on rimsherds and bases from the stratified groups

	Rimsherds				Base sherds			
	Sooted	Carbonized	Limescale	n	Sooted	Carbonized	Limescale	n
Iron Age	41	2	-	58	4	9	4	23
First century	53	5	2	59	15	10	5	20
Second century	49	7	-	69	-	7	-	15

Table 7.19

Hawling Road. Percentage incidence of sooting on vessels from various northern sites

	Rimsherds			Base sherds		
	Sooted	Limescale	n	Sooted	Limescale	n
Beadlam ditch (sceond century)	20	-	10	17	-	6
Greta Bridge (Phase 4, early–mind third)	18	-	49	19	11	27
Greta Bridge (Phase 5, late third)	26	-	34	-	-	10
Brough B II (4)	14	3	29	-	-	4
Brough F XII) (3)+ XIV (4	17	-	66	20	-	10
Piercebridge HS77EX (late fourth)	52	-	73	11	6	18
Piercebridge HS77EW (late fourth)	35	-	55	6	6	17
Huntcliff (late fourth)	33	2	49	13	-	23

only 2.5km to the north-west, where second-century assemblages are dominated by grey wheel-made fabrics, which show some form parallels with north Lincolnshire industries such as Roxby, Dragonby and Thealby (Rigby 1976). These contrasts must suggest that even by the second century the nucleated centres had not become fully articulated into the local economy as centres for the distribution of goods. Shiptonthorpe would appear to have functioned more as a roadside settlement servicing a passing trade at this period, rather than being a primary focus of local supply mechanisms. There is no trace of the use of status goods on the Hawling Road site, no terra rubra, terra nigra or butt beakers have been found. The quantity of such goods on native sites north of the Humber is far from great, excepting Redcliff (North Ferriby; Crowther and Didsbury 1988), the only material known to this author is from Thorpe Thewles (Millett 1983), Stanwick (Wheeler 1954; Haselgrove and Turnbull 1985), Hayton (Rigby 1988, 318 and fig. 17.2) and Rudston (Rigby 1980). (Dressel 2-4 amphorae in the region cannot be identified as pre-conquest, except by form, because of second- to third-century imports in the same fabric (Arthur 1982), known for example from sites at Catterick, South Shields and York (Williams *pers. comm.*))

The contrast with the considerable quantities of such imports at Redcliff is all the greater for their general absence north of the Humber and this site looks more similar to sites such as Dragonby on the south bank of the Humber than as a *chef lieu* within East Yorkshire. The minute samian ware collection from Hawling Road shows that this was not selectively acquired as a status good here, unlike the situation on north Welsh rural sites (Evans *forthcoming* b and c) where samian appears to arrive before other Roman pottery and disproportionate quantities of decorated material tend to have been acquired. This latter phenomenon may well also be the case at Rudston (Pengelly 1980, 37) where there is more than twice as much decorated South Gaulish samian as plain ware. This together with the presence of Gallo-Belgic imports on that site does seem to point to a comparatively high status in the late Iron Age and pre-villa Roman phases. This is also the case at Stanwick where around 45 percent of the South Gaulish samian is decorated and the form assemblage has a number of very rare types (Millett unpublished). The quantity of samian ware from the 1985 excavation at Shiptonthorpe also seems to be rather low, so the pattern may be more generally in this region.

Despite the lack of change in the form assemblage the change in the fabric types in use after the Roman conquest does seem to suggest some impact on the economy of the site. Given the absence of the hand-made fabrics found here at Shiptonthorpe it seems very probable that the post-conquest fabrics were made on or very closely adjacent to the site, whereas the use of calcite temper in nearly all the Iron Age pottery tends to suggest that it was coming from at least a little distance away (or that calcite was being brought to the site as a tempering agent). The latter explanation is regarded as less probable as, although many later Iron Age sites do use calcite tempered wares, some, such as Emmotland (Brewster 1963), seem to have been quite happy to use other tempering agents for the same range of forms. It would seem, therefore, that the conquest disrupted the functioning of some earlier mechanism of pottery supply.

7.5 Medieval and Post-Medieval evidence

7.5.1 The evidence from the excavation (Illus. 7.5)

Ceramics from the twelfth century, and especially fourteenth century onwards, were recovered from the excavation. The unstratified medieval material was mainly concentrated between 220 and 310E with a further slight concentration between 330 and 350E. A similar distribution pattern was provided by the fifty-one nails from the excavation. Since none of the nails occurred in earlier contexts, and the only stratified association was with some post-medieval pottery, the hypothesis that most of them were medieval or later seems likely. The spread of the medieval pottery was mainly associated with the cut post-holes and pits in the gravel. Whilst a dozen of the features contained medieval pottery, no structures were evident. The most obvious feature is the rig and furrow surviving cut into the gravel of an unknown date. It is possible that a number of lines of post-holes parallel to these date to this period.

Post-medieval ceramics are found from 210 to 340E. The post-medieval distribution extends over the area of post holes but also right up to the east end of the trench and over the Iron Age/Early Roman enclosures.

7.5.2 The field-walked pottery

by Jeremy Evans

Unlike the Iron Age and Roman pottery distributions, the medieval pattern is much more dispersed (Illus. 7.16), though concentrating slightly on the north-eastern side of the gravel ridge. Although some twelfth-century material (fabric 853) is present the vast bulk of the material from the site is of Humber ware and coarse sandy ware (of thirteenth-fifteenth century date). None of the hand-made ceramic fabrics matched any known early Anglo-Saxon fabrics from the area. The quantity of medieval material in contrast to post-medieval (Illus. 7.16) does suggest occupation at a level above night-soiling in the later medieval period at least, as indeed is borne out in the excavated area.

Illus. 7.16 shows the distribution of post-medieval (seventeenth to twentieth century) material. There is much less of this than medieval material and much is probably derived from manuring, the only concentration is in the north-east corner of the field. Illus. 7.16 shows the distribution of tile from the field-walking grid. This has a dispersed spread like the post-medieval material and again is concentrated in the north-east corner of the field. The material and its distribution, lacking any tegulae or imbrices, and concentrated where post-medieval pottery is concentrated, demonstrates the tile's post-medieval date and the absence of tile from the later Roman site in the south of the field, as well as from the early Roman site (which the excavated material confirms).

By the time documentary evidence begins with the enclosure award of 1776 (Land of the Duke of Devonshire no. 159), the field was bare; only to be intruded upon in the twentieth century by the construction of an electricity pylon and then in 1989 the By-pass.

7.5.3 The medieval and later coins

by Richard Brickstock

The Northumbrian styca is almost certainly a copy produced *c.* A.D. 840-55. The hoards of York and district include large numbers of unofficial copies which occur most commonly in the southern province of Deira. This example is well worn, but can probably be best paralleled by unofficial copies of the 'Hexham' type (cf. most similar to 'uncertain 23' in Adamson's plates of the 1832 Hexham hoard).

Coins 21-23 were found during the surface survey:
References: *English Hammered Coinage, Volume 2, Edward 1-Charles II, 1272-1662*, by J. J. North (1960).

21 'NORTHUMBRIAN STYCA COPY'
date: *c.* 840-855 mint: - cat: see above
diam: 10.6mm wt: - wear: W/W
Obv -
Rev -

22 HENRY VIII denom: AR 1d
date: 1509-47 mint: LN cat: North 1808
diam: 15.0 mm wt: 0.6 g wear: VW/W
Obv H.D.G. ROSA SIE S PIA
Rev LON-DON-CIVI-TAS

23 C17th COPPER TRADE TOKEN denom: ½d
date: 1669 mint: - cat: -
diam: 19.0 mm wt: 1.7 g wear: W/W
Obv ...OTT...
Rev ...-1669-OF...HIS/HALF/[PENNY]

7.6 The Hawling Road ceramic series

by Jeremy Evans with John Creighton

7.6.1 Introduction

The interpretation of the ceramics in functional and cultural terms has been incorporated into the narrative above. The aim of this section is to use the material from Hawling Road to present a ceramic series for the area, particularly for the hand-made fabrics.

First the ceramic fabric descriptions are given. The fabric codes are part of a longer sequence which will be used for the material from Shiptonthorpe in due course. Only those fabrics appearing at this site have been included. All the codes have a letter prefix followed by a number. The letter divides them up into finewares (F), greywares (G), oxidized fabrics (O), reduced fabrics (R), mortaria (M) and white wares (W). Within this broad division the number sequence divides up the material on the basis of the primary inclusions. The subheadings should enable a match to be made fairly readily.

Secondly the stratified forms are listed and illustrated. These have been listed in their fabric sequence and are referred to by their fabric reference then a sequential form number within each fabric. The context for all of these is provided and similar examples from other sites are referenced for additional dating evidence.

Thirdly the ceramic groups from the excavation are discussed. Detailed quantified information is given including the seriation and stratigraphic evidence providing dating evidence for the material.

By using a combination of these sections it is hoped that a realistic date-span for many of the hand-made fabrics in the area can be obtained.

7.6.2 The fabric descriptions

The fabrics are described here by eye, all are wheel-made unless stated otherwise. Inclusion frequency is described respectively by the terms 'occasional', 'some', 'common' and 'abundant', and inclusion size by the terms 'fine', 'moderate' and 'coarse'.

Finewares

F11	Nene Valley colour-coated ware (Howe *et al.* 1980).
F15	A white roughcast fabric with a brown colour-coat, tempered with very fine orange grog(?) inclusions >0.1mm. Very probably Nene Valley despite the roughcasting.
F51	A pale orange fabric with some fine sand temper *c.* 0.1mm, surfaces appear finely micaceous.
F70	Crambeck parchment ware (Evans 1989).

Greywares

Hand-made greywares with calcite inclusions:

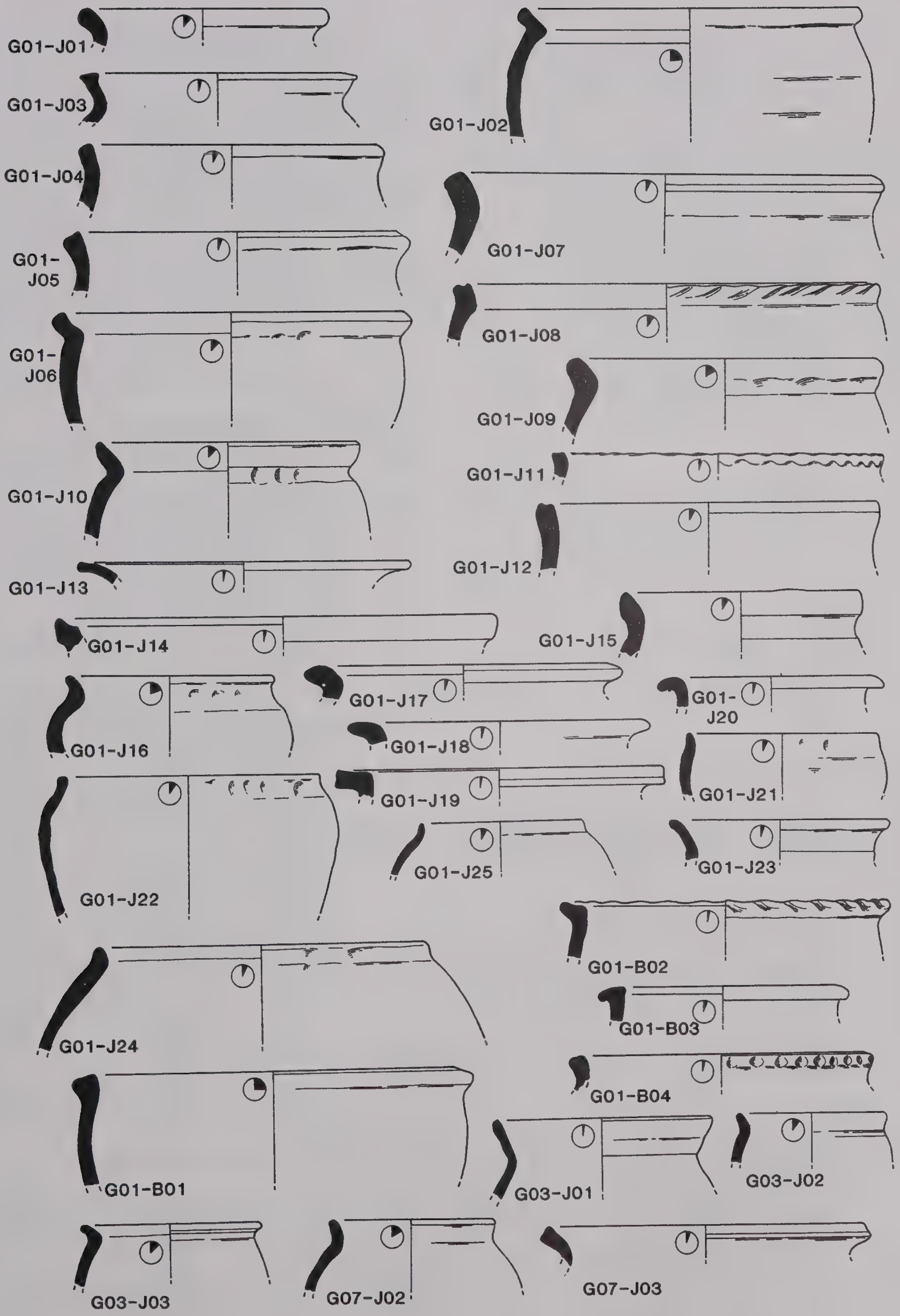
G01	Calcite gritted ware, a reduced, hand-made fabric with abundant crushed calcite temper *c.* 0.5-4mm and some red/brown ironstone inclusions *c.* 2-3mm. This fabric group covers both the Iron Age calcite gritted ware and the third to fourth century A.D. Knapton and Huntcliff type wares as they cannot be completely isolated from the Iron Age sherds by fabric, although the forms are distinctive. The range of inclusions sizes can be greater in sherds of Iron Age date and an attempt has been made to date the field-walking sherds within the overall date range. Almost always undecorated; one early sherd has parallel incised horizontal grooves. At Bursea House called Fabrics LH1and 2.
G03	A reduced, hand-made fabric, often with oxidized brown surfaces, with abundant fine calcareous inclusions *c.* 0.3-1mm.
G07	A reduced, hand-made fabric, with surfaces often burnt brown. It has abundant, rounded, translucent and white quartz temper *c.* 0.5-1.5mm and some limestone inclusions *c.* 1-3mm. At Bursea House called Fabric LH4.
G091	A reduced, hand-made fabric with common calcareous temper voids *c.* 1-2mm and common coarse sand temper *c.* 0.4-1.0mm.
G092	A hand-made fairly hard black fabric, with common coarse sand temper *c.* 0.3-0.4mm, some calcareous sand temper *c.* 0.3mm
G093	A reduced, hand-made fabric with common calcite tempering *c.* 0.5-3mm and some/common sub-angular, pinkish, hard opaque quartz-like inclusions, *c.* 0.5-3mm.
G096	A hand-made fabric, usually with blotchy oxidized brown surfaces, but probably reduced fired, with abundant calcite inclusions *c.* 0.5-4mm and common orange (?)grog inclusions 0.5-2mm.
G097	A hand-made, reduced fabric, with surfaces often burnt brown with some calcareous inclusions *c.* 0.5-1mm and some ironstone inclusions *c.* 0.5-2mm.

Hand-made greywares with shell inclusions:

G10	Dales ware (Loughlin 1977), a hand-made fabric with tournette-finished rim and common fossil shell inclusions.
G14	A black hard, hand-made fabric, with some shell inclusions up to 3mm, some quartz inclusions *c.* 1mm and some sub-rounded calcareous inclusions *c.* 1-2mm.

Hand-made greywares with quartz and stone inclusions:

G25	A hand-made fabric, reduced fired but with surfaces often burnt brown. It has abundant sub-angular quartz inclusions *c.* 0.5-2mm added as tempering and large oval rounded thin brown ironstone inclusions *c.* 3-6mm in length.
G26	A hand-made fabric, reduced, sometimes with brown margins but usually black surfaces with abundant sub-angular quartz *c.* 0.5-3mm. At Bursea House called Fabric LH3, and is similar to LH7.
G27	A hand-made grey fabric, with common-abundant moderate sand temper *c.* 0.3mm.



Illus. 7.16 *Hawling Road. Pottery form series, numbers G01-J01 to G07-J03. Scale 1:4*

G28	A hand-made, reduced fabric with surfaces often burnt brown and sometimes hand-burnished with abundant finish sand temper *c.* 0.2mm and occasional calcareous inclusions *c.* 2-3mm. The exterior is quite frequently hand burnished.
G29	A reduced, hand-made fabric, with surfaces often burnt brown. It has common, angular, pinkish, hard opaque, quartz-like inclusions *c.* 2-7mm.
G291	A black hand-made fabric, with common angular, black shiny stone inclusions *c.* 1-4mm and some brown ironstone inclusions *c.* 11mm.
G293	A hand-made, reduced fabric with surfaces sometimes burnt brown. It has abundant, opaque and translucent, sub-rounded quartz tempering.
G294	A reduced, hand-made fabric with surfaces often oxidized. It has common angular translucent quartz temper *c.* 1mm and common large gold mica flakes *c.* 0.3-1mm. At Bursea House called Fabric LH5

Hand-made greywares with grog inclusions:

G32	A hand-made, reduced fabric, with some calcite inclusions *c.* 1-3mm, some red ironstone inclusions *c.* 1-2mm and occasional rounded translucent quartz *c.* 0.5-1mm. The group is not well defined.
G33	A reduced, hand-made fabric with surfaces often oxidized. It is tempered with common large grog inclusions *c.* 3-10mm.

Hand-made greywares with organic voids:

G41	A hand-made, reduced fabric with occasional calcite inclusions *c.* 1-3mm and abundant organic tempering voids.

Hand-made greywares with flint inclusions:

G52	A reduced, hand-made, fabric with surfaces often oxidized. It has some fine sand temper *c.* 0.2mm, some brown ironstone inclusions *c.* 0.5-2.0mm and common small grey and white flint inclusions *c.* 1-2mm.

Hand-made greywares with ironstone inclusions:

G60	A hand-made, reduced fabric, often with burnt oxidized surfaces, with abundant red-brown sub-rounded ironstone inclusions *c.* 2-4mm.
G90	A grey hard fabric, with some fine sand temper *c.* 0.1mm and common grey grog (?) inclusions *c.* 1-2mm.

Wheel-made greywares with quartz inclusions:

G101	This comprises both the Holme-on-Spalding Moor gritted ware of the fabric employed for making Dales-type jars at Bursea House (Fabric B) and a visually identical fabric with forms paralleled at Brough in the late first century. A hard, reduced fabric with abundant translucent quartz temper *c.* 0.5-1.0mm and occasional black ironstone inclusions *c.* 1-2mm.
G102	A reduced fabric with abundant sub-rounded translucent and black quartz inclusions *c.* 0.5-2mm. A little came from the Bursea House excavations where it was called fabric X1.

Oxidized fabrics

O16	An oxidized fabric with an orange core and brown margins and surfaces with common coarse sand temper *c.* 0.3-4mm.
022	A very hard oxidized fabric with reduced surfaces, with some limestone/chalk sand inclusions, generally *c.* 0.3mm with occasional ones *c.* 2mm.
026	An oxidized fabric with orange core and orange-brown surfaces, with some fairly fine sand temper *c.* 0.2mm and common rounded calcareous inclusions *c.* 0.2-3mm.

Reduced fabrics

Wheel-made sand tempered reduced fabric

R06	A reduced mid-grey fabric with some fine sand temper >*c.* 0.1mm.
R07	Holme-on-Spalding Moor greyware. A very hard, mid grey fabric with little visible tempering, principally fourth century. It formed the major part of the output of the Throlam kilns, whereas earlier ones tended to produce a sandier fabric. This is very similar to Bursea Fabrics A1 and A2.
R09	Crambeck greyware (Evans 1989).
R10	A hard reduced fabric, with a 'crisp' fracture, with some moderate sand temper *c.* 0.3mm.
R11	A reduced fabric with common moderate sand temper *c.* 0.3mm. Almost certainly from more than one source, some of this material may be from the Holme-on-Spalding Moor industry, but it is not distinguishable by fabric alone.
R18	A reduced fabric with dark grey core, brown margins and dark grey surfaces with common coarse-ish sand temper *c.* 0.3-0.4mm.
R19	A reduced fabric with dark grey core, light grey margins and dark grey surfaces, some fine sand temper *c.* 0.1mm. At Bursea House called Fabric LW6.
R191	A reduced fabric with darkish grey core and dark grey surfaces with abundant fine sand temper *c.* 0.1mm and common orange-brown ironstone(?) inclusions *c.* 0.5-1mm. Surfaces appear finely micaceous. At Bursea House called Fabric LW5.
R192	A reduced dark grey-brown fabric, with some dark sand inclusions *c.* 0.4mm.
R194	A hard reduced fabric, with dark blue grey core, orange margins and grey surfaces, some translucent quartz temper *c.* 0.3-2.0mm.

Wheel-made finely burnished reduced fabric

R24	A reduced fabric with dark grey core, buff margins and dark grey surfaces, with some black ironstone *c.* 0.2mm and some fine sand >*c.* 0.1mm. At Bursea House called Fabric LW3.
R25	A reduced fabric with mid-grey core and margins and dark grey burnished surfaces with some fine silver mica.

Wheel-made reduced fabric with calcareous sand

R33	A reduced, hand-made fabric with dark grey core, light grey margins and grey surfaces with common fine sand temper *c.* 0.2mm and occasional limestone/chalk sand inclusions *c.* 0.3mm.
R34	A reduced, laminar fabric with orange brown core and dark grey surfaces with some moderate sand temper *c.* 0.3mm and some chalk/limestone sand *c.* 0.3mm.
R35	A reduced fabric with common chalk/limestone sand temper *c.* 0.3mm and some fine sand *c.* 0.1mm. At Bursea House called Fabric LW4.
R38	A hard grey fabric, with some fine calcareous sand temper *c.* 0.2mm and some fine sand *c.* 0.2mm.

Wheel-made reduced fabric with grog

R50	A reduced fabric with mid grey core and grey-brown margins and surfaces, with common moderate sand temper *c.* 0.4mm and occasional grey grog inclusions *c.* 3-4mm.
R51	A reduced grey fabric with fine common orange-brown grog(?) inclusions *c.* 0.1-0.3mm and common fine sand temper *c.* 0.2mm.

Wheel-made reduced fabric with flint

R60	A reduced blue-grey fabric with common fine sand temper *c.* 0.2mm and some limestone/chalk sand *c.* 0.3mm and occasional flint inclusions *c.* 2-4mm.

Mortaria

M091	An orange-buff mortarium fabric, with common moderate sand temper *c.* 0.2mm and some *c.* 0.4mm. No evidence of the trituration grits. Probably north Gaulish.
M13	Mancetter-Hartshill whiteware mortaria. White fabric with some ironstone inclusions. Trituration grits; black and orange grog *c.* 2-7mm.
M15	A buff mortarium fabric with rather laminar fabric with common buff clay pellets *c.* 1-3mm and occasional red-brown ironstone inclusions *c.* 3-5mm and common fine silver mica.trituration grits; a mixture of white/grey flint, translucent quartz, brown ironstone and grey-brown stone *c.* 2-3mm. Probably a fairly local product.

White wares

W30	A hard white fabric, with some orange ironstone inclusions *c.* 2-4mm.

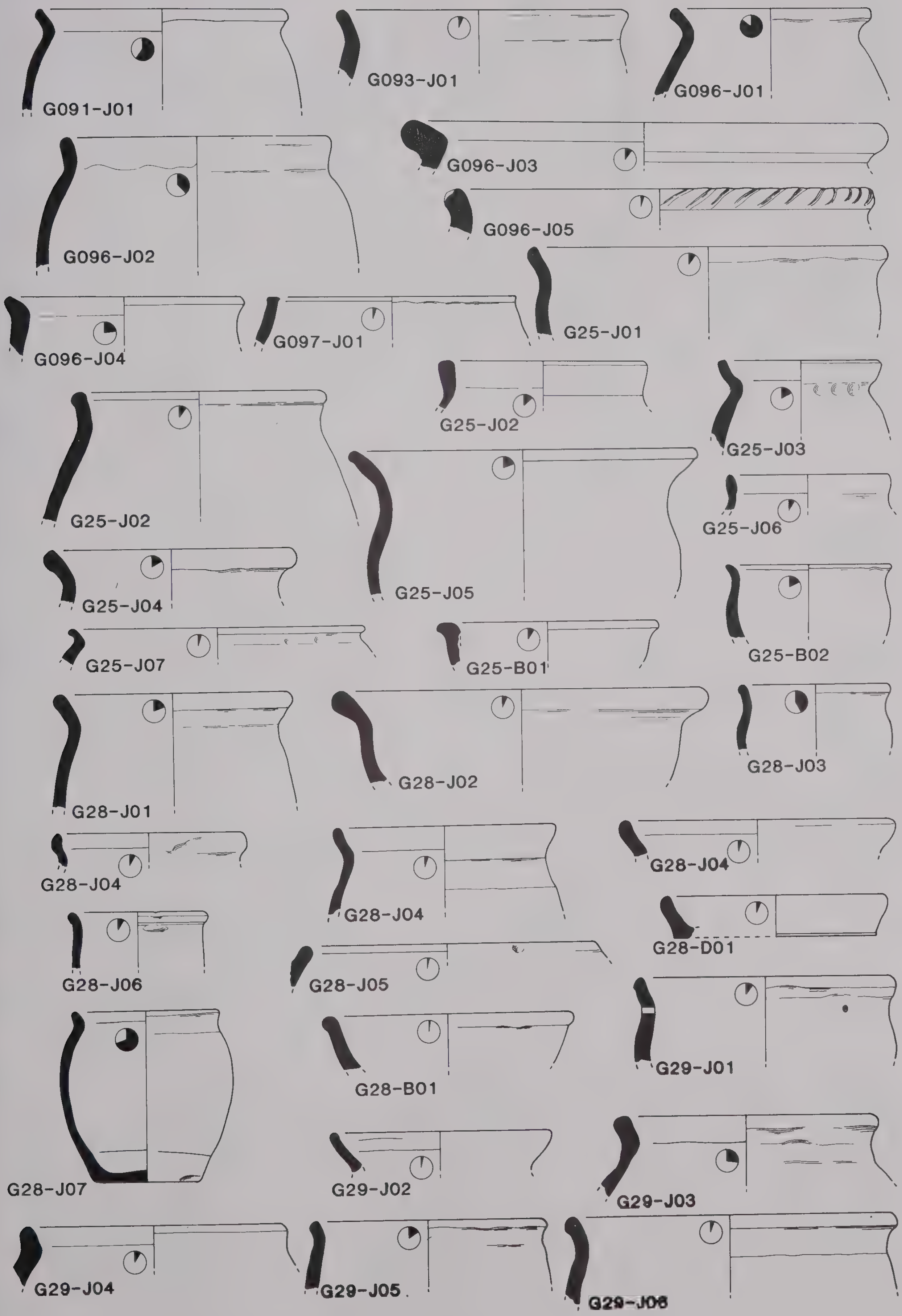
Medieval fabrics

Thirty-one medieval and later fabrics occurred on the site. These are described in the site archive.

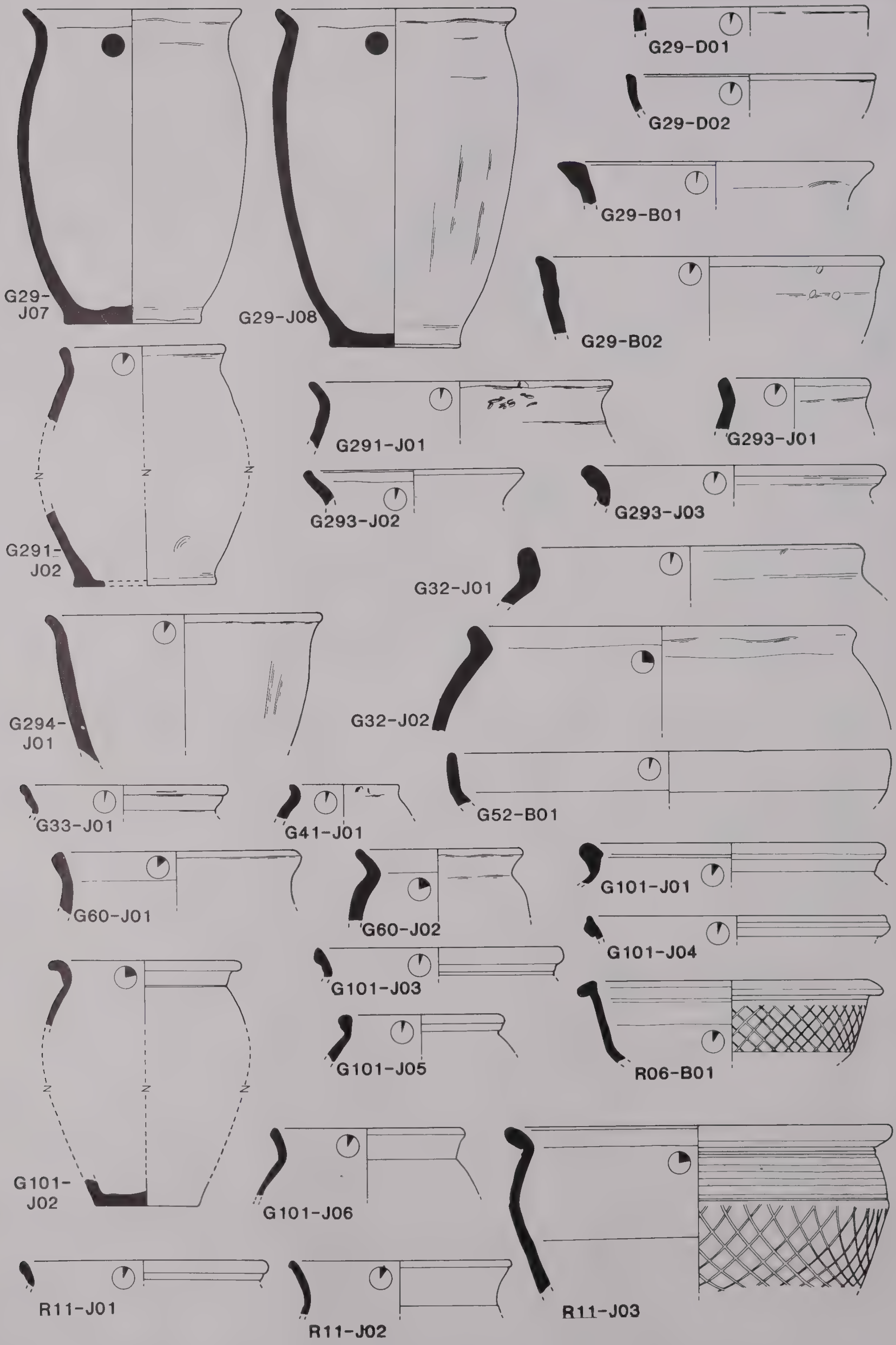
7.6.3 The stratified forms (Illus. 7.17-7.20)

Fabric/Form	Context	Description and parallels
G01-J01	(4007)	Jar with thickened everted rim.
G01-J02	(530)	Square-ended everted rimmed jar, basically of Knapton type. Cf. Crossgates (Rutter and Duke 1958), type 2/10; Rudston (Rigby 1980), nos 11, 13, 17, 31-33, and 49; Emmotland (Brewster 1963), fig. 85 nos 6 and 10, fig. 86, nos 5 and 6, fig. 87 nos 3, 6 and 7, fig. 88 nos 8 and 9 and fig. 91, no. 14.
G01-J03	(533)	Jar with everted pushed down rim. Cf. Rudston (Rigby 1980), nos 54 and 69; Loughlin (1977) no. 61.
G01-J04	(4007)	Jar with fairly vertical, slightly everted rim. Cf. Beadlam ditch (Evans 1996); Roxby (Inman *et al.* 1985) fig. 4, nos 3 and 6, fig. 5, House 1, nos 61, 98 and 138, fig. 5, House 4, no. 2; Rudston (Rigby 1980), nos 26 and 63; Brough (Wacher 1969), no. 1; Emmotland (Brewster 1963), fig. 85, no. 9, fig. 86, no. 1, fig. 87, no. 11, fig. 88, nos 3-5 and 10; Kilham (Brewster 1963), fig. 92, no. 1.
G01-J05	(4031)	Jar with fairly vertical, slightly everted thickening, wedge-shaped rim. Cf. Rudston (Rigby 1980), nos 6 and 35; Crossgates (Rutter and Duke 1958), type 2/7; Emmotland (Brewster 1963), fig. 90, no. 8; Beadlam (Evans 1996.).
G01-J06	(4031)	Everted rimmed jar or bowl with slightly lid-seated rim. Cf. Rudston (Rigby 1980), no. 18; Beadlam (Evans 1996.).
G01-J07	(4031)	Jar with rather vertical everted thickened rim. Cf. Crossgates (Rutter and Duke 1958), types 2/1 and 2/3-2/5; Rudston (Rigby 1980) no. 14; Emmotland (Brewster 1963), fig. 88, no. 6, fig. 90, no. 6; Thornham Hill (Brewster 1963), fig. 90, no. 9.
G01-J08	(4031)	Jar with vertical thickened rim, grooved on top and decorated with slashing. Some similarity to Rudston (Rigby 1980), no. 202.
G01-J09	(500)	Jar with thickened, everted rounded rim. Cf. Roxby (Inman *et al.* 1985), fig. 4, no. 6; Stanwick (Haselgrove and Turnbull 1985), fig. 6, 6th drawing; Dragonby (Elsdon and May 1987) fig. 16, no. 1615(?) and fig. 28, no. 1854.

G01-J10	(4017)	Everted rimmed jar with triangular ended rim. Cf. Kendale (Brewster 1963), fig. 92, nos 1 and 3.
G01-J11	(4031)	Jar with vertical, slightly everted rim and finger-tip decoration on the rim. Cf. Thornham Hill (Brewster 1963), fig. 78, no. 3, fig. 79, nos 5 and 7 and fig. 77 no. 2.
G01-J12	(4031)	As G07-J03 but grooved on end of rim. Cf. Staple Howe (Brewster 1963), fig. 48, no. 10; Emmotland (Brewster 1963), fig. 87, no. 5.
G01-J13	Unstratified	Lid seated jar.
G01-J14	(4031)	Fragment of unusual everted lid-seated jar rim.
G01-J15	(4031)	Slightly shouldered jar.
G01-J16	(4004)	Jar with S-bend profile, thinning towards rim. Cf. Crossgates (Rutter and Duke 1958), types 4/3-4/9; Rudston (Rigby 1980), nos 117 and 138.
G01-J17	(1107)	Jar with internal groove and S-bend type rim, mid-late fourth century.
G01-J18	(4031)	Shouldered(?) jar with everted, horizontal tapering rim. Cf. Rudston (Rigby 1980), nos 12 and 19.
G01-J19	(4031)	Jar with everted horizontal, square-ended rim, rim end grooved. Some similarity to Emmotland (Brewster 1963) fig. 87, no. 1.
G01-J20	(4031)	Jar with hooked rim and internal groove, mid-late fourth century. Cf Rudston (Rigby 1980), nos 255 and 258.
G01-J21	(4031)	Jar with simple, insloping rim. Cf. Crossgates (Rutter and Duke 1958) types 4/12-4/13; Roxby (Inman *et al.* 1985), fig. 5, House 2, no. 14; Rudston (Rigby 1980), no. 1; Danes Graves (Brewster 1963), fig. 83 nos 4 and 6 and fig. 84, no. 2.
G01-J22	(4031)	Jar with simple incurving rim. Cf. Thornham Hill (Brewster 1963), fig. 79, no. 3; Sledmere (Brewster 1963), fig. 92, no. 6; Staple Howe (Brewster 1963), Hut II, fig. 54, no. 2, Hut I, fig. 50, no. 2, Palisade Trench II, fig. 35, no. 8.
G01-J23	(4007)	Thin walled everted rimmed jar. Cf. Crossgates (Rutter and Duke 1958), type 1E; Rudston (Rigby 1980), nos 45, 57 and 66.
G01-J24	(4031)	Jar with simple slightly upturned rim. Cf. Stanwick (Haselgrove and Turnbull 1985), fig. 6, second drawing; Emmotland (Brewster 1963), fig. 86, no. 4, fig. 88, no. 2.
G01-J25	(4031)	Jar with vertical, tapering rim. Cf. Rudston (Rigby 198), no. 1 ; Crossgates (Rutter and Duke 1958), type 9B/1-9B/3; Danes Graves (Brewster 1963), fig. 84, no. 2.
G01-B01	(4031/4037)	Bowl with pushed-down flattened rim, exterior burnished. Cf. Rudston (Rigby 1980) no. 6.
G01-B02	(4031)	Bowl with everted horizontal rim, slashed on rim. Cf. Emmotland (Brewster 1963), fig. 87, no. 1.
G01-B03	(4031)	Bowl(?) with flat pushed down rim.
G01-B04	(4031)	Bowl(?) with pushed down rim as B014.01, decorated with finger-tip impressions. Cf. Thornham Hill (Brewster 1963) fig. 78, no. 4 and fig. 79, no. 1.
G03-J01	(4007)	Everted rimmed jar, similar to Knapton type (the drawn example is very thin walled). Cf. Rudston (Rigby 1980), nos 4, 9 and 25-27.
G03-J02	(4031)	Jar with vertical, slightly everted rim, rim and exterior well burnished. Cf. Beadlam (Evans 1996.); Crossgates (Rutter and Duke 1958) types 4/12-4/13; Roxby (Inman *et al.* 1985), fig. 5, House 2, no. 14, fig. 4, no. 3; Stanwick (Haselgrove and Turnbull 1985), fig. 6, fourth drawing; Emmotland (Brewster 1963), fig. 86, no. 1, fig. 88, nos 10 and 14; Morfitt Collection (Brewster 1963), fig. 90, no. 1.
G03-J03	(4000)	Jar with insloping shoulder and small, outurned rim. Cf. Crossgates (Rutter and Duke 1958), types 4/6-4/8; Rudston (Rigby 1980), nos 117 and 138.
G07-J01	not illus.	Everted rimmed Knapton type jar. Cf. Crossgates (Rutter and Duke 1958), type 2/10; Rudston (Rigby 1980), nos 11, 13, 17, 31-33, and 49; Emmotland (Brewster 1963), fig. 85 nos 6 and 10, fig. 86, nos 5 and 6, fig. 87 nos 3, 6 and 7, fig. 88 nos 8 and 9 and fig. 91, no. 14.
G07-J02	(4007)	Jar with vertical rim. Cf. Beadlam (Evans 1996.); Roxby (Inman *et al.* 1985), fig. 4, no. 3, fig. 5, House 1, nos 61, 96 and 138 and fig. 5, House 4, no. 2; Rudston (Rigby 1980), nos 26 and 63; Brough (Wacher 1969), no. 1; Emmotland (Brewster 1963), fig. 85, no. 9, fig. 86, no. 1, fig. 87, no. 11, fig. 88, nos 3-5 and 10; Kilham (Brewster 1963), fig. 92, no. 1.
G07-J03	(4031)	Jar with everted, wedge-shaped rim. Cf. Thornham Hill (Brewster 1963), fig. 91, no. 16; Rudston (Rigby 1980), no. 34.
G091-J01	(277/286)	An everted rimmed jar, similar to the Knapton form but it has a rather shorter rim. Cf. Crossgates (Rutter and Duke 1958), type 2/10; Rudston (Rigby 1980), nos 11, 13, 17, 31-33, and 49; Emmotland (Brewster 1963), fig. 85 nos 6 and 10, fig. 86, nos 5 and 6, fig. 87 nos 3, 6 and 7, fig. 88 nos 8 and 9 and fig. 91, no. 14.
G093-J01	(4006)	Jar with vertical, slightly everted rim. Cf. Beadlam ditch (Evans 1996.); Roxby (Inman *et al.* 1985) fig. 4, nos 3 and 6, fig. 5, House 1, nos 61, 98 and 138, fig. 5, House 4, no. 2; Rudston (Rigby 1980), nos 26 and 63; Brough (Wacher 1969) no. 1; Emmotland (Brewster 1963), fig. 85, no. 9, fig. 86, no. 1, fig. 87, no. 11, fig. 88, nos 3-5 and 10; Kilham (Brewster 1963), fig. 92, no. 1.
G096-J01	(500)	Everted rimmed jar. Cf. Crossgates (Rutter and Duke 1958, types 4/8-4/9; Emmotland (Brewster 1963), fig. 85, no. 7, fig. 91, no. 15; Rudston (Rigby 1980), no. 41.
G096-J02	(500)	Jar with vertical, slightly everted rim. Drawn example has an orange-brown iron rich slip on the



Illus. 7.17 *Hawling Road. Pottery form series, numbers G091-J01 to G29-J06. Scale 1:4*



Illus. 7.18 *Hawling Road. Pottery form series, numbers G29-J07 to R11-J03. Scale 1:4*

		interior of rim and exterior. Cf Roxby (Inman *et al.* 1985, fig. 4, no. 3; Beadlam (Evans 1996.); Emmotland (Brewster 1963), fig. 85, no. 9; Kilham (Brewster 1963), fig. 92, no. 1; Rudston (Rigby 1980), no. 26.
G096-J03	(1133)	Jar with thickened short everted rounded rim. Cf. Beadlam (Evans 1996.); Rudston (Rigby 1980), no. 18; Crossgates (Rutter and Duke 1958), type 2/2-2/5.
G096-J04	(500)	Jar with vertical rounded rim. Cf. Weaverthorpe (Brewster, 1963), fig. 91, no. 6; Emmotland (Brewster 1963), fig. 85, no. 3.
G096-J05	(4017)	Jar with insloping wall and slightly upturned simple rim decorated with slashing.
G097-J01	(4023)	Jar with slightly more vertical, square ended, insloping rim. Some similarity to Rudston (Rigby 1980), no. 211; Kilham (Brewster 1963), fig. 92, no. 3.
G25-J01	(4030)	Jar with fairly vertical, slightly everted rim, rim diameter exceeds girth. Cf. Brough (Wacher 1969) no. 461which is more thistle-shaped than the drawing suggests; Morfitt Collection (Brewster 1963), fig. 90, no. 2.
G25-J02	(4007)	Jar with vertical slightly everted rim. Cf. Beadlam ditch (Evans 1996.); Roxby (Inman *et al.* 1985) fig. 4, nos 3 and 6, fig. 5, House 1, nos 61, 98 and 138, fig. 5, House 4, no. 2; Rudston (Rigby 1980), nos 26 and 63; Brough (Wacher 1969 no. 1; Emmotland (Brewster 1963), fig. 85, no. 9, fig. 86, no. 1, fig. 87, no. 11, fig. 88, nos 3-5 and 10; Kilham (Brewster 1963), fig. 92, no. 1.
G25-J02 another	(1133)	As above.
G25-J03	(4007)	Jar with everted, slightly lid-seated rim. Cf. Beadlam (Evans 1996); Rudston (Rigby 1980), no. 86.
G25-J04	(4007)	Jar with everted and beaded rim. Cf. Rudston (Rigby 1980) nos 13, 31, 48, 51, 72, 113, 134, 147, and 186.
G25-J05	(4006)	Rather globular, necked jar with everted rim. Cf. Emmotland (Brewster 1963), fig. 87, no. 9.
G25-J06	(4007)	Jar with beaded, fairly vertical rim.
G25-J07	(4007)	Small jar with stubby everted rim. Cf. Crossgates (Rutter and Duke 1958 types 4/7-4/8; Rudston (Rigby 1980) no. 19.
G25-B01	(1017)	Bowl(?) with pushed down thickened rim. Some similarity to jar from Roxby (Inman *et al.* 1985, House A, no 4).
G25-B02	(4007)	Bowl(?) with slightly everted thinning rim
G28-J01	(4007)	Everted rimmed Knapton type jar. Cf. Crossgates (Rutter and Duke 1958), type 2/10; Rudston (Rigby 1980), nos 11, 13, 17, 31-33, and 49; Emmotland (Brewster 1963), fig. 85 nos 6 and 10, fig. 86, nos 5 and 6, fig. 87 nos 3, 6 and 7, fig. 88 nos 8 and 9 and fig. 91, no 14.
G28-J02	(4007)	Everted rimmed jar with rim exceeding girth, rim and exterior burnished. Cf. Brough (Wacher 1969), no. 461; Rudston (Rigby 1980), nos 10 and 144; Morfitt Collection (Brewster 1963), fig. 90, no. 2.
G28-J03	(1133)	Jar with fairly vertical, slightly everted rim. Cf. Beadlam (Evans 1996.); Roxby (Inman *et al.* 1985), fig. 4, no. 3, fig. 5, House 1, nos 61, 96 and 138 and fig. 5, House 4, no. 2; Rudston (Rigby 1980), nos 26 and 63; Brough (Wacher 1969), no. 1; Emmotland (Brewster 1963), fig. 85, no. 9, fig. 86, no. 1, fig. 87, no. 11, fig. 88, nos 3-5 and 10; Kilham (Brewster 1963), fig. 92, no. 1.
G28-J04	(1017)	Slightly lid-seated(?), everted rimmed jar. Cf. Beadlam (Evans 1996.); Rudston (Rigby 1980), no. 86.
G28-J04 another	(4030)	As above.
G28-J04 another	(4031)	As above.
G28-J05	(4037)	Jar with simple, insloping rim. Cf. Danes Graves (Brewster 1963), fig. 84, no. 1 and fig. 90, no. 7; Rudston (Rigby 1980), no. 152.
G28-J06	(4017)	Jar with vertical wall and slightly beaded rim.
G28-J07	(500)	Squat jar with insloping shoulder and small vertical upturned rim. Cf. Crossgates (Rutter and Duke 1958), type 4/13; Emmotland (Brewster 1963), fig. 86, no. 1 and fig. 87, no. 11; Rudston (Rigby 1980), no. 21.
G28-D01	(500)	Simple rimmed platter(?). Cf. Knapton (Corder and Kirk 1932), no. 21.
G28-B01	(4007)	Bowl with slightly beaded rim. Some similarity to Kendale (Brewster 1963), fig. 92, no. 4.
G29-J01	(4007)	Jar with fairly vertical, slightly everted rim. Cf. Beadlam (Evans 1996.); Roxby (Inman *et al.* 1985), fig. 4, no. 3, fig. 5, House 1, nos 61, 96 and 138 and fig. 5, House 4, no. 2; Rudston (Rigby 1980), nos 26 and 63; Brough (Wacher 1969), no. 1; Emmotland (Brewster 1963), fig. 85, no. 9, fig. 86, no. 1, fig. 87, no. 11, fig. 88, nos 3-5 and 10; Kilham (Brewster 1963), fig. 92, no. 1.
G29-J02	(4030)	Slightly lid-seated, everted rimmed jar. Cf. Beadlam (Evans 1996.); Rudston (Rigby 1980), no. 86.
G29-J03	(547)	Jar with fairly vertical, slightly everted thickened rim. Cf. Crossgates (Rutter and Duke 1958), type 2/1-2/5; Rudston (Rigby 1980), no. 14; Emmotland (Brewster 1963), fig. 90, no. 8.
G29-J04	(4031)	Jar with thickened, rounded vertical rim. Cf. Stanwick (Haselgrove and Turnbull 1985), fig. 6, fourth drawing; Dragonby (Elsdon and May 1987), fig. 28, no. 1854.
G29-J05	(4007)	Jar with insloping wall and vertical simple rim. Cf. Roxby (Inman *et al.* 1985), fig. 4, House A, no. 2 and fig. 5, House 4, no. 2; Emmotland (Brewster 1963), fig. 86, no. 2 and fig. 87, no. 10.
G29-J06	(4017)	Jar with insloping shoulder and vertical simple rim.

G29-J07	(277)	Jar with simple, slightly outsloping rim thinning towards its end. The illustrated example is an almost complete vessel from pit 326. Cf. Roxby (Inman *et al.* 1985), fig. 5, House 2, no. 14; Crossgates (Rutter and Duke 1958), type 9B/1-9B/3; Rudston (Rigby 1980), nos 1, 123 and 207; Danes Graves (Brewster 1963), fig. 83 no. 4.
G29-J08	(277/286)	Barrel-shaped jar, almost complete with thick slightly beaded rim. Cf. Danes Graves (Brewster 1963), fig. 82, no. 1.
G29-D01	(4032)	Dish(?) with vertical wall and simple rim. Cf. Rudston (Rigby 1980), no. 16.
G29-D02	(4007)	Incurving walled simple rimmed dish. Cf. Rudston (Rigby 1980), no. 16.
G29-B01	(4031)	Bowl(?) with pushed-own thickened rim. Cf. Rudston (Rigby 1980), no. 5.
G29-B02	(538)	Bowl(?) with simple slightly beaded rim. Cf. Emmotland (Brewster 1963), fig. 88, no. 2; Dragonby (Elsdon and May 1987), fig. 13, no. 945.
G291-J01	(4037)	Everted rimmed jar, roughly of Knapton type. Cf. Crossgates (Rutter and Duke 1958), type 2/10; Rudston (Rigby 1980), nos 11, 13, 17, 31-33, and 49; Emmotland (Brewster 1963), fig. 85 nos 6 and 10, fig. 86, nos 5 and 6, fig. 87 nos 3, 6 and 7, fig. 88 nos 8 and 9 and fig. 91, no. 14.
G291-J02	(1017)	Jar with fairly vertical slightly everted rim. Cf. Beadlam (Evans 1996.); Roxby (Inman *et al.* 1985), fig. 4, no. 3, fig. 5, House 1, nos 61, 96 and 138 and fig. 5, House 4, no. 2; Rudston (Rigby 1980), nos 26 and 63; Brough (Wacher 1969), no. 1; Emmotland (Brewster 1963), fig. 85, no. 9, fig. 86, no. 1, fig. 87, no. 11, fig. 88, nos 3-5 and 10; Kilham (Brewster 1963), fig. 92, no. 1.
G293-J01	(4032)	Jar with vertical, slightly everted rim. Cf. Beadlam (Evans 1996.); Rudston (1980), no. 26; Roxby (Inman *et al.* 1985), fig. 4, no. 3; Emmotland (Brewster 1963), fig. 85, no. 9.
G293-J02	(4017)	Slightly lid-seated, everted rimmed jar. Cf. Beadlam (Evans 1996); Rudston (Rigby 1980), no. 86. Fabric G41
G293-J03	(4031)	Shouldered(?) jar with everted, thickened rim. Cf. Stanwick (Haselgrove and Turnbull 1985), fig. 6, ninth drawing.
G294-J01	(500)	Wide-mouthed jar/bowl with slightly outturned simple rim. Cf. Roxby (Inman *et al.* 1985), fig. 5, House 2, no. 3; Dragonby (Elsdon and May 1987), fig. 29, no. 124.
G32-J01	(4037)	Jar with thickened everted rim. Cf. Roxby (Inman *et al.* 1985), fig. 4, no. 6; Stanwick (Haselgrove and Turnbull 1985), fig. 6, fourth drawing; Dragonby (Elsdon and May 1987), fig. 28, no. 1854.
G32-J02	(533)	Globular jar with fairly vertical, rounded rim. Cf. Roxby (Inman *et al.* 1985), fig. 4, no. 6; Stanwick (Haselgrove and Turnbull 1985), fig. 6, fourth drawing; Dragonby (Elsdon and May 1987), fig. 16, no. 1615, fig. 28, no. 1854; Rudston (Rigby 1980), no. 21.
G33-J01	(277)	Thin everted rimmed jar rim fragment. Cf. Rudston (Rigby 1980), nos 26, 88 and 110.
G41-J01	(547)	Jar with insloping wall and simple slightly everted rim. Cf. Crossgates (Rutter and Duke 1958), type 4/6-4/8; Rudston (Rigby 1980), nos 117 and 138.
G52-J01	(4031?)	Everted rimmed jar, cf. G03-J01. Not drawable.
G52-B01	(1017)	Carinated bowl with simple inturned rim, exterior burnished. Cf. Crossgates (Rutter and Duke 1958), type 29/2; Staple Howe (Brewster 1963), Palisade Trenches II and III, fig. 42, nos 6 and 8 and Palisade Trench III, fig. 40, no. 4.
G60-J01	(4007)	Jar with fairly vertical, slightly everted rim. Cf. Beadlam (Evans 1996.); Roxby (Inman *et al.* 1985), fig. 4, no. 3, fig. 5, House 1, nos 61, 96 and 138 and fig. 5, House 4, no. 2; Rudston (Rigby 1980), nos 26 and 63; Brough (Wacher 1969), no. 1; Emmotland (Brewster 1963), fig. 85, no. 9, fig. 86, no. 1, fig. 87, no. 11, fig. 88, nos 3-5 and 10; Kilham (Brewster 1963), fig. 92, no. 1.
G60-J02	(4006)	Everted rimmed jar roughly of Knapton type. Cf. Crossgates (Rutter and Duke 1958), type 2/10; Rudston (Rigby 1980), nos 11, 13, 17, 31-33, and 49; Emmotland (Brewster 1963), fig. 85 nos 6 and 10, fig. 86, nos 5 and 6, fig. 87 nos 3, 6 and 7, fig. 88 nos 8 and 9 and fig. 91, no. 14.
G101-J01	Unstratified	Jar with thick rounded rim with internal offset, identical to Brough (Wacher 1969), no. 4, Flavian
G101-J02	(277)	A shouldered jar with almost beaded rim, probably second century or later. Cf. Brough (Wacher 1969), no. 126?
G101-J03	(4003)	Slightly everted jar rim with wedge-shaped section.
G101-J04	(4023)	Carinated(?) jar rim with beaded and grooved rim.
G101-J05	(4009)	Small jar with beaded and grooved rim.
G101-J06	(277/286)	An everted rimmed jar with fairly vertical and slightly thickening rim.
R06-B01	(4030)	Flange rimmed dish with chamfered base and acute lattice decoration. Hadrianic-Antonine.
R11-J01	(4032)	Shouldered jar with beaded rim.
R11-J02	(?4032)	Carinated bowl with sinuous profile, outsloping wall and beaded rim, cf. Hayes and Whitley 1950, type 10; Brough (Wacher 1969), no. 49.
R11-J03	(4030)	Carinated wide-mouthed jar with heavily beaded rim.
R11-J04	(4009)	Jar with everted slightly thickened rim. Cf. Rudston (Rigby 1980), nos 63, 80 and 108; Brough (Wacher 1969), nos 54 and 64.
R11-J05	(286)	Cavetto rimmed jar, perhaps a BB1 copy, in which case third century.
R11-D01	(4031)	Gallo-Belgic copy dish, cf. Brough (Wacher 1969), no. 51.
R18-J01	(1017)	Everted rimmed jar with squared rim end and thickening wedge-shaped rim. Some similarity to Brough (Wacher 1969), no. 17.
R18-J02	(1017,1103,1105)	Carinated jar with beaded everted rim grooved on the rim.

R18-J03	(286)	Everted rimmed jar. Cf. Rudston (Rigby 1980), nos 62, 71 and 78-79; Brough (Wacher 1969), nos 62 and 121.
R18-J04	(281)	Everted rimmed jar rim fragment.
R18-J05	(1133)	Everted rimmed jar. Cf. Rudston (Rigby 1980), nos 62, 71 and 79; Brough (Wacher 1969), nos 62 and 121.
R18-B01	(281)	Flange rimmed dish with rising thin rim. Probably ultimately derived from the BB1 flange rimmed dishes and bowls, perhaps Hadrianic-Antonine.
R19-L01	(1133)	Lid with grooved rim and incised wavy line decoration near rim on interior. Cf. Brough (Wacher 1969), no. 48.
R19-J01	(547)	Carinated jar with outsloping wall and curved neck with beaded rim. Cf. Norton (Hayes and Whitley 1950), type 10; Rudston (Rigby 1980), nos 90 and 100.
R192-J01	(4011)	Carinated(?) jar with everted wedge-shaped rim with concave end. Cf. Brough (Wacher 1969), nos 141 and 261.
R194-L01	(277)	Lid knob, string marks on top of knob.
R24-J01	(4007)	Carinated jar with curving neck and beaded rim. Cf. Rudston (Rigby 1980), no. 129.
R34-J01	(1133)	Slightly shouldered jar with vertical slightly beaded rim. Cf. Brough (Wacher 1969), no. 311.
R35-J01	(500)	Carinated jar with fairly vertical neck and everted beaded rim. Cf. Rudston (Rigby 1980), no. 99; Brough (Wacher 1969), no. 84.
O16-J01	(1105)	Jar/beaker with rather vertical everted rim, probably Flavian. Cf. Brough (Wacher 1969), no. 116; Gillam (1970), type 167, *c* A.D. 80-120.
O16-J02	(4000)	Small jar/beaker with vertical slightly everted rim. Cf. Gillam (1970), type 71, A.D. 150-200.
M13-M01	(1045)	Grooved wall-sided mortarium. Cf. Gillam (1970), type 283, *c.* A.D. 250-350.
M15-M01	(547)	Hooked flanged mortarium with low bead. Cf. Gillam (1970) type 239, A.D. 80-110 and type 246, A.D. 120-160.
F51-B01	(1018)	Bowl rim with cordons below rim and rouletted zone below, probably Drag. 30 copy.

7.6.4 The ceramic groups

There were thirty well stratified groups of ceramics. Eighteen of them contained enough material in order to make a seriation of the deposits possible (Illus. 7.11). The dating of these groups can therefore be defined in three ways. First, by the spot dating of the individual groups, secondly by the seriation sequence; and thirdly by a small number of stratigraphic relationships on the site. The deposits have been arranged in approximate chronological sequence in Illus. 7.21 where the seriation and stratigraphic relationships have been given precedence over the spot dating.

Beneath follows a description of these contexts and the material within them. The description is from the western end of the site to the eastern end. All the features can be found on various illustrations, particularly the area details Illus. 7.7-7.9. Four occur elsewhere and so are indicated on the over all phased plans Illus. 7.4 and 7.5. Numbers outside brackets are fill numbers, whilst numbers in square brackets are the cut number of features.

Ceramics by area

240-250E

Posthole 230 [682] (Illus. 7.5) contained a single twelfth-century rimsherd.

281 [800] (Illus. 7.10) was a large pit containing Roman material. It contained a jar and a flange rimmed bowl in an early sandy greyware (R18-B01 and R18-J04) and a bodysherd of a roughcast colour-coated fabric (F15). The group probably dates to the Hadrianic - early Antonine period.

250-260E

Pit [326] (Illus. 7.10) produced quite a large collection of material from two fills, 277 and 286. These seem to date to the first or second century, probably the former, and includes a fragment of imported north Gallic mortarium (fabric M091). Table 7.20 shows the fabric proportions for these two fills.

Taking the two fills together they contain nine different jar rims and a single lid. Eight out of the ten rims are sooted and two show the presence of internal carbonized deposits. Around 7 percent of the pottery in both groups is wheel-made. Table 7.21 lists the forms present in the two groups.

The fabric figures are dominated by fabric G29, but this is not likely to be a good reflection of the fabrics elsewhere on the site as most of it comes from the sherds making up two vessels [G29-J07, G29-J08] which are substantially complete. Such vessels are unusual from site assemblages and to have two from a single feature may suggest their deposition here as a votive deposit.

270-280E

Pit 1045 [1046] (Illus. 7.5) contained a third century Mancetter-Hartshill mortarium rim (M13-M01).

One other feature from this area was pit 1107 [1104] (Illus. 7.5). This contained a greyware carinated jar (R18-J02) and a rusticated bodysherd (fabric R11). The former vessel cross-joins with sherds in the fills 1017 and 1133 of the western ditch.

280-290E

This area contained three parallel ditches and a few pits. Only one of the pits contained pottery, pit 1107 [4044] (Illus. 7.8), which included a rim sherd of later fourth-century calcite gritted ware of form G01-J17.

The easternmost ditch [1106], with fills 1016, 1013 and 1105, has rusticated bodysherds (fabric R18) and a north Gaulish mortarium sherd (fabric M091) from context 1016 which tends to suggest a first-century date, but there is also an intrusive glazed medieval handle sherd, whilst 1105 included a Flavian oxidized jar (O16-J01) and a greyware carinated jar (R18-J02) which cross-joins with a first-century group in 1103 and with context 1017, part of the western ditch fill. Context 1013 included a rusticated greyware bodysherd in fabric R18 and a bowl rim in fabric G52 (G52-B01).

The western ditch [1134] has fills 1133, 1018 and, perhaps 1017. Fill 1133 contained enough material to be quantified and the fabric figures are shown in Table 7.22.

The dominant hand-made fabric in this context is G25, which mainly appears in the form of everted rimmed jars, here G25-J01 and G25-J02, and would appear to be exclusively Roman on the site. The group is unusual in having over 30 percent of its fabrics wheel-made, whereas most groups seem to have less than 10 percent. Five of the six rimsherds are jars, the other being a lid and half of these have sooted rims demonstrating their use as cooking vessels. Table 7.23 lists the forms present in the group.

Context 1018 only contains two sherds, one of them being an oxidized Drag. 37 copy bowl (F51-B01), probably of second-century date.

Context 1017 also provided a quantifiable group, the fabric figures being shown in Table 7.24.

Some 26 percent of the group is wheel-made, a similar proportion to that in 1133, the fabric proportions, however, are very different from those in 1133. Some 43 percent or so of the group is in fabrics associated with Iron Age features and fabric G25 makes up less than 15 percent compared with around 50 percent in context 1133. Overall the group would seem to be rather earlier than 1133, perhaps first century. The forms present in the group are listed in Table 7.25.

The forms present comprise six jars and two bowls, three of the vessels are sooted and one has internal carbonized deposits. Overall, perhaps it might be suggested that the fills of this ditch date from the first to earlier second centuries.

300-330E

The area 300-330E contains a series of intersecting ditches (Illus. 7.9), the relationships between which are unclear. Ditch [4008] had two fills containing pottery, 4007 and 4006, and there is pottery from a box section of the ditch, 4000. Fill 4007 contained a large group of material, quantified in Table 7.26.

Only 11.0 percent of the group is wheel-made, in contrast to the groups from the ditch fills 1017 and 1133 in 280-290E. However, the high proportion, around 35-40 percent, of fabric G25 is comparable with the *c.* 40-50 percent from 1133. Given 55 rim sherds a reliable functional analysis may be performed on the group (Table 7.27).

The group is heavily dominated by jars, with very few dishes and bowls, making it appear very Iron Age in character. The proportion of jars being very high, even for a rural site. Some 43.7 percent of the rims are sooted and 9.1 percent show evidence of internal carbonized deposits. Table 7.28 lists the forms present in the group.

Fill 4006 contained much less pottery, but just about enough to be quantifiable (Table 7.29).

Only 2.2 percent of the fabrics are wheel-made, compared with 11 percent in 4007, and the proportion of fabric G25 runs from 15-30 percent compared with 30-40 percent in 4007, with higher proportions of fabrics G29 and G60. These features tend to suggest that this group preceded 4007, although not necessarily by a large margin. Table 7.30 lists the forms present in 4006.

There were only six rim sherds from the group, all being jars and five of them being sooted on the rim.

The final group associated with this ditch is 4000, which comprises the finds from a box-section of it. The group is about large enough to quantify (Table 7.31).

Around 15 percent of the group is wheel-made, rather higher than from the two groups examined above, but fairly similar to the larger group from 4007. The proportion of fabric G25 is less than in 4007 and the proportions of calcite gritted wares (fabrics G01 and G096) and fabric G28 greater, the latter two groups probably being, at least predominantly, Iron Age fabrics. The forms present in the groups are listed in Table 7.32.

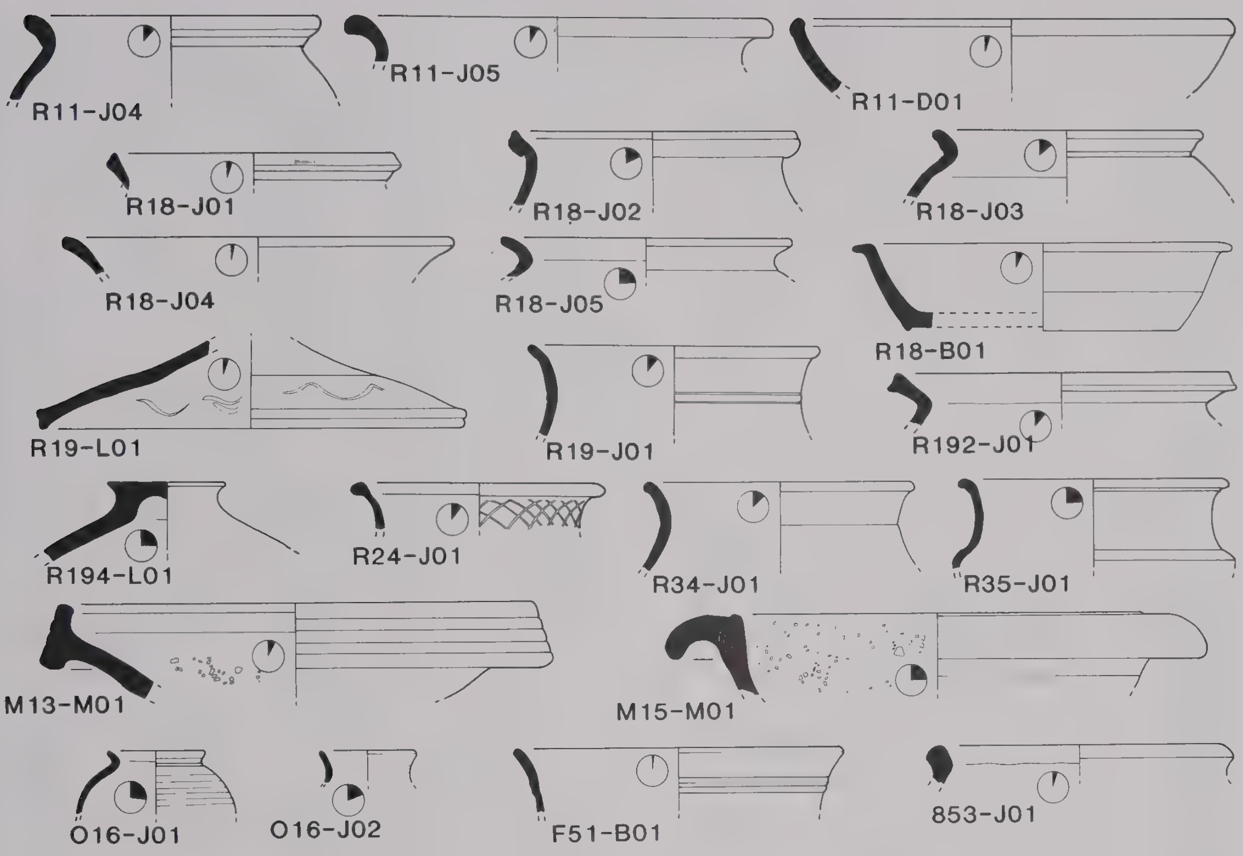
All six rim sherds are jars and three of them have sooted rims. Overall it might be suggested that 4007 dates to the early second century with 4006 preceding it, presumably in the first.

Running north-east to south-west and intersecting with ditch [4008] was ditch [4014]. The fill of this (4013) contained only eighteen sherds of pottery, ten in fabric G01, three in fabric G28 and one in fabrics G25 and G29, with two wheel-made sherds in fabric R11 and one in fabric G101. There are two jar rims from the context, G01-J02 and G29-J01, one has a sooted rim. The predominance of Iron Age style fabrics in the list, together with some wheel-made sherds, perhaps suggests a first-century date. A further section of this ditch seems to have been made with the fill recorded as 4009. Some twenty-one sherds are recorded from 4009; three in fabric G01, two in G28, and one each in fabrics G29, G097, G32, G33 and G294 together with three of fabric G25 and eight wheel-made sherds, three each in fabrics R191 and R11 and one each in fabrics R38 and G101. Three jars are recorded from the context, two with sooted rims: G25-J01, R11-J04 and G101-J05. Four of the greyware sherds have acute lattice burnished decoration and this and the high proportion of wheel-made material, together with a reasonable proportion of fabric G25, if not a high one, tends to suggest that the context has a Hadrianic-Antonine date.

Fabric figures for ditch [4014] may be put together by combining the information from 4013 and 4009, Table 7.33.

Some 27 percent of the material from the combined group is wheel-made whilst the high proportion of calcite gritted ware (G01) tends to suggest an early date, the combined group suggests like the two groups from which it is made up a chronological spread through from the first into, at least, the mid second century.

A section of ditches [4008] and [4014] where they intersected with ditches [4018] and [4020] was made, this, 4011, only contained nine sherds, three in fabric G29 and one each in fabrics G28, G291 and G33 and three wheel-made sherds, two in fabric R11 and one in fabric R192. This is



Illus. 7.19 *Hawling Road. Pottery form series, numbers R11-J04 to F51-B01. Scale 1:4*

clearly a Roman group, although whether first or second century is not easily determinable. Only one rim sherd was recovered from the group, a jar (R192-J01) with an externally sooted rim.

Two ditches, [4018] and [4020], continue the course of [4008] which, from the plan, appears to have originally turned to join with [4014]. There is one fill to [4018], 4017, which contains a quantifiable group (Table 7.34).

Iron Age style fabrics are predominant with less than 8 percent of fabric G25 and only 3.2 percent of all sherds being wheel-made, and a first-century date might be suggested. The forms present are listed in Table 7.35, all are jars and six out of nine vessels have externally sooted rims.

There is also a group of material from clearance over the top of ditches [4018] and [4020], context 4023. Context 4023 is not strictly stratified and contains a Humber ware body-sherd and a tile fragment, however most of its material is likely to derive from these ditch fills as sherds cross-joining with 4017 demonstrate. There are some fifty-six Iron Age and Roman style sherds in the 4023 collection, the fabric proportions of which are set out in Table 7.36.

The proportion of wheel-made material in the group is low, only *c.* 3 percent, but the high proportion of fabric G25 and the low proportion of calcite gritted wares suggests a comparatively late date, probably second century, whilst one of the greyware sherds has obtuse burnished lattice decoration and is likely to be third century. On balance the bulk of this material is probably second century. Table 7.37 lists the forms present in this group.

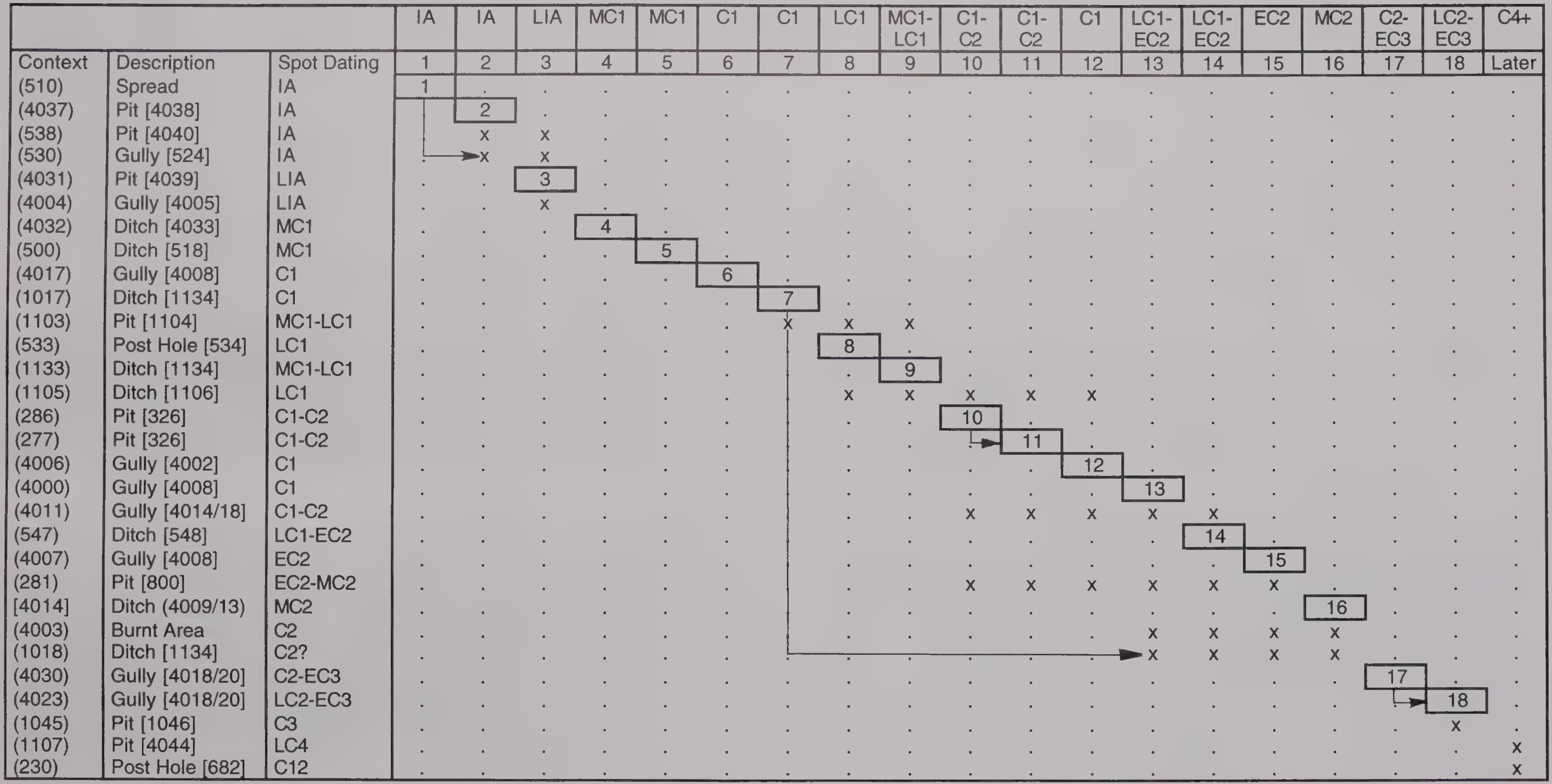
The forms represented are four jar rims, one of which is externally sooted.

There is a further deposit from ditches [4018] and [4020], context 4030, recorded as sealed by 4023 and, presumably, representing the upper fills of [4018] and [4020] in the area 311-14E and 397-400N. Context 4030 contained sixty-three sherds, the fabric proportions of which are shown in Table 7.38.

Only around 10 percent of the group is wheel-made, but the proportion of calcite gritted fabrics is comparatively low and that of fabric G25 reasonably high. One of the greyware sherds has acute burnished lattice decoration and another has an obtuse lattice decoration. The forms present in the group are listed on Table 7.39. Overall the date of the group would seem to be Hadrianic-Antonine, probably extending slightly into the third century.

The forms from the context comprise seven jars and a single bowl, with five of the jars having external soot deposits on their rims.

Running parallel to ditch [4008] was another [4005], this contained a single fill, 4004, which contained twenty-three sherds, twenty-one in fabric G01 and one each in fabrics G29 and G52. There were no wheel-made sherds. The forms



			IA	IA	LIA	MC1	MC1	C1	C1	LC1	MC1-LC1	C1-C2	C1-C2	C1	LC1-EC2	LC1-EC2	EC2	MC2	C2-EC3	LC2-EC3	C4+
Context	Description	Spot Dating	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Later
(510)	Spread	IA	1																		
(4037)	Pit [4038]	IA		2																	
(538)	Pit [4040]	IA		x	x																
(530)	Gully [524]	IA		x	x																
(4031)	Pit [4039]	LIA			3																
(4004)	Gully [4005]	LIA			x																
(4032)	Ditch [4033]	MC1				4															
(500)	Ditch [518]	MC1					5														
(4017)	Gully [4008]	C1						6													
(1017)	Ditch [1134]	C1							7												
(1103)	Pit [1104]	MC1-LC1							x	x	x										
(533)	Post Hole [534]	LC1								8											
(1133)	Ditch [1134]	MC1-LC1									9										
(1105)	Ditch [1106]	LC1								x	x	x	x	x							
(286)	Pit [326]	C1-C2										10									
(277)	Pit [326]	C1-C2											11								
(4006)	Gully [4002]	C1												12							
(4000)	Gully [4008]	C1													13						
(4011)	Gully [4014/18]	C1-C2										x	x	x	x	x					
(547)	Ditch [548]	LC1-EC2														14					
(4007)	Gully [4008]	EC2															15				
(281)	Pit [800]	EC2-MC2										x	x	x	x	x	x				
[4014]	Ditch (4009/13)	MC2																16			
(4003)	Burnt Area	C2													x	x	x	x			
(1018)	Ditch [1134]	C2?													x	x	x	x			
(4030)	Gully [4018/20]	C2-EC3																	17		
(4023)	Gully [4018/20]	LC2-EC3																		18	
(1045)	Pit [1046]	C3																		x	
(1107)	Pit [4044]	LC4																			x
(230)	Post Hole [682]	C12																			x

☐ Context with sufficient material to be seriated
↳ Seriation confirmed by stratigraphic link
X Approximate date span for un-seriated groups

Illus. 7.20 *Hawling Road. The stratified groups in approximate chronological order based upon the seriation (Illus. 7.11), spot dating and the limited stratigraphic evidence*

Table 7.20

Hawling Road. Pottery fabric proportions from pit [326]

Fabric	Lower Fill 286	Upper Fill 277		
	Per cent sherd number	Per cent weight	Per cent sherd number	Per cent weight
G091	9.7	16.4	3.1	1.1
G25	12.5	9.9	7.3	6.1
G28	-	-	3.1	1.9
G29	72.2	68.6	77.1	81.1
G32	-	-	2.1	0.7
G33	-	-	1.0	0.2
G101	1.4	0.6	3.1	5.6
M091	1.4	1.2	-	-
R11	2.8	1.8	2.1	0.2
R18	1.4	1.5	-	-
R194	-	-	1.0	3.2
number	72	1794	96	2141

Table 7.21

Hawling Road. Pottery forms present in Pit [326]

Fabric	Forms
G091	G091-J01
G29	G29-J07, G29-J08
G32	Similar to G32-J01
G33	G33-J01
G101	G101-J02, G101-J06
R11	R11-J05
R18	R18-J03
R194	R194-L01

Table 7.22

Hawling Road. Pottery fabric proportions from context 1133

Fabric	Per cent sherd number	Per cent weight
G01	2.3	3.6
G07	1.1	0.6
G25	50.6	42.0
G28	4.5	6.1
G29	4.5	2.0
G32	3.4	12.3
G52	3.4	2.0
R11	2.3	1.6
R18	7.9	5.4
R19	2.3	6.9
R191	1.1	0.5
R34	16.9	16.4
number	89	1156

Table 7.23

Hawling Road. Pottery forms present in context 1133

Fabric	Forms
G25	G25-J01, G25-J02
G28	G28-J03
R18	R18-J05
R19	R19-L01
R34	R34-J01

Table 7.24

Hawling Road. Pottery fabric proportions in context 1017

Fabric	Per cent sherd number	Per cent weight
G01	18.1	10.5
G07	1.4	0.5
G096	6.9	1.8
G097	2.8	4.3
G25	7.4	10.1
G28	5.6	9.2
G29	5.6	2.9
G293	1.4	1.2
G294	1.4	2.7
G33	8.3	8.1
G52	12.5	10.1
G101	1.4	8.5
R06	1.4	3.1
R11	11.1	18.2
R18	8.3	2.6
R19	2.8	3.1
R35	1.4	3.1
number	72	742

Table 7.25

Hawling Road. Pottery forms present in context 1017

Fabric	Forms
G01	G01-J21
G07	Similar to G01-J23
G25	G25-B01
G28	G28-J04
G52	G52-B01
R18	R18-J01, R18-J02, R18-J05

present were a jar (G01-J16, Iron Age not fourth century) and a dish (G29-D01). A late Iron Age or early Roman date seems appropriate, perhaps more likely late Iron Age.

There is one other group of material from this area, from context 4003, a spread of dark burnt material. This contained sixteen sherds; two in fabric G01 and two in fabrics G29 and G28, with five in the later fabric G25, 3 in the wheel-made sandy greyware R11 and one in G101, making a quarter of the sherds being wheel-made. One of the sherds in fabric R11 is decorated with acute burnished lattice decoration and is probably from a Hadrianic-Antonine Black Burnished ware copy jar. This and the quantity of fabric G25 tend to suggest a second-century date for the group. There is a single sooted rimsherd (G101-J03).

340-380E

This area forms a discrete part of the site (Illus. 7.7), enclosed by a ditch [4033] and [4036] which originally had a droveway running through it, but which seems to have been later narrowed by a further stretch of ditch, [548], to reduce the entrance to a footpath about 1m wide. Within the area are a number of pits and a short stretch of gully, [518], which seems to be about parallel with [548].

Iron Age

There are a pair of large intersecting pits in the interior, 4031 and 4037 [4038], which provide quite good groups, apparently of Iron Age date. Pit 4031, the largest, contained 328 sherds all of which were hand-made, excepting one greyware dish (R11-D01) which would seem to suggest a first-century date for the group. However, this sherd came from the finds bag which also contained a Humber Ware jug rim and a Humber Ware bodysherd with a cistern bung hole, which would seem to be intrusive, presumably from the base of the ploughsoil. There is also a proto-Huntcliff calcite gritted ware jar (G01-J20) probably of mid fourth-century date and again intrusive. The evidence of the early Roman Gallo-Belgic copy dish, therefore, is at best equivocal and given the rest of the assemblage a late Iron Age date seems to best represent the group. Table 7.40 provides quantified data on the fabrics present in 4031.

Fabric G29 does seem to originate as a minor fabric in this Iron Age group, but it is much more frequent in later early Roman groups.

Table 7.41 lists the forms present in the group and Table 7.42 a functional analysis of the rimsherds. Some 44 percent of all the rimsherds have evidence of external sooting, but only 20 percent show internal carbonized deposits.

The group from pit 4037 [4038] is much smaller, sixty-eight sherds, but quantifiable and of very similar compositions to that from 4031 (Table 7.43). None of the material is wheel-made and calcite gritted ware dominates the assemblage.

The forms present in the group are listed in Table 7.44. There are seven jars and a single bowl, two of which have sooted rims.

There is one other small quantifiable group from this area of Iron Age date from a spread of material 510 (Table 7.45).

The preponderance of calcite gritted wares and the absence of any wheel-thrown material in this group both suggest an Iron Age date, although in this case the fabric G25 is probably intrusive or misidentified. Table 7.46 lists the forms present, unusually there are three jars, a bowl and a dish, the latter forms being unusual in these hand-made coarse fabrics.

The forms seem consistent with the Iron Age date proposed.

Context 530 is recorded as the upper fill of [524], this contains three calcite gritted sherds (fabric G01) and two of fabric G29, with a single sooted jar (G01-J02).

A number of other features produce small quantities of apparently Iron Age material from this area, without any later pottery, and could, therefore, also be of Iron Age date, although an early Roman date cannot be ruled out. These included a large pit, 538, which produced seven calcite gritted ware sherds (fabric G096), two of fabric G29 and one of fabric G097, with the single form represented being a bowl (G29-B02) with a sooted rim.

Roman

A small group of material comes from the enclosure ditch 4032 defining the area, [4033]. This would appear to be of Roman date to judge by the presence of a carinated jar rimsherd in wheel-thrown greyware (R11-J02), however, other features of the collection suggest that if this sherd is not intrusive then the group is early in the Roman sequence. Fabric G25 is absent from the group and wheel-made material accounts for only 6 percent of the sherds. Table 7.47 lists the fabric proportions from the feature and Table 7.48 the forms.

The forms consist of some five jars and a single dish, with one of the jars being externally sooted. This group forms an interesting contrast with the material from 547 [548], the ditch fill of the blocking of the droveway entrance.

Ditch 547 contained 56 sherds of which only 3.6 percent were wheel-made. Fabric G25 appears in some quantity, *c.* 20 percent, in contrast to the group from 4032, but in lesser quantities than in features more securely dated to the second century. *Inter alia*, 547 contained a carinated wheel-made greyware jar (R19-J01) and a buff mortarium rim (M15-M01) of late first to early second-century date. A guess might be made at a late Flavian-Trajanic range for the group. Table 7.49 lists the fabric proportions from 547.

Table 7.50 lists the forms from 547, which contained four jars and a mortarium rim, one of the jars having a sooted rim.

About 17m to the east of 547 was another stretch of ditch, 500 [518], also apparently of Roman date, but perhaps earlier than 547 and presumably first century. (It is quite possibly Iron Age if the one wheel-made sherd is intrusive, although the proportion of fabric G25 suggests this is probably not the case; certainly it contains an intrusive seventeenth- to nineteenth-century base sherd, presumably from the bottom of ploughsoil.) Table 7.51 lists the fabric proportions from 500.

The dominant fabric types are the calcite gritted wares (G01 and G096) providing around 40 percent of the group, with wheel-made fabrics only providing 0.3 percent and

Table 7.26

Hawling Road. Pottery fabric proportions in context 4007

Fabric	Per cent sherd number	Per cent weight	Per cent minimum number of rims	Per cent minimum number of vessels	Per cent rim equivalent
G01	12.4	6.8	18.2	13.2	10.7
G03	4.2	1.9	3.6	2.6	1.8
G07	4.8	3.7	10.9	7.9	14.3
G092	1.7	0.7	-	3.9	-
G096	1.4	1.8	-	2.6	-
G25	38.8	44.6	36.4	28.9	34.3
G27	0.3	0.2	-	1.3	-
G28	5.6	8.5	7.3	5.3	8.9
G29	15.8	18.4	18.2	13.2	24.8
G294	0.3	0.3	-	1.3	-
G33	2.0	1.8	-	2.6	-
G52	0.3	0.1	-	1.3	-
G60	2.0	2.6	1.8	1.3	3.2
G101	0.3	0.1	-	1.3	-
G102	1.4	0.9	-	2.6	-
R11	7.6	7.2	-	5.3	-
R18	0.3	0.2	-	1.3	-
R24	0.3	0.1	1.8	1.3	2.0
R34	0.3	-	1.8	1.3	-
R35	0.3	0.1	-	1.3	-
number	355	7005	55	76	440

Table 7.27

Hawling Road. Functional analysis of vessels from 4007 (by minimum numbers of rims per cent)

Jars	Bowls	Dishes	
91	5.5	3.6	n = 55

Table 7.28

Hawling Road. Pottery forms present in 4007 (by minimum numbers of rims)

Fabric	Forms
G01	G01-J01, G01-J02(x3), As G01-J02, G01-J04, G01-J05, G01-J23, G01-J24, G01-B01
G03	G03-J01(x2)
G07	G07-J01(x3), G07-J02(x2), G07-J02
G25	G25-J02(x12), G25-J03, G25-J04(x3), G25-J06, G25-J07, G25-B02
G28	G28-J01, G28-J02, G28-J03, G28-J??, G28-B01
G29	G29-J01, G29-J01(x5), G29-J05(x2), G29-D01, G29-D02
G60	G60-J01
R24	R24-J01
R34	Similar to R24-J01

Table 7.29

Hawling Road. Pottery fabric proportions from context 4006

Fabric	Per cent sherd number	Per cent weight
G01	23.9	4.5
G093	2.2	3.1
G25	15.2	33.0
G27	2.2	6.4
G29	21.7	31.0
G33	10.9	3.7
G60	17.4	8.7
G90	2.2	8.2
R11	2.2	1.4
number	46	803

Table 7.30

Hawling Road. Pottery forms present in context 4006 (by minimum numbers of rims)

Fabric	Forms
G093	G093-J01
G25	G25-J05
G29	G29-J01(x3)
G60	G60-J02

Table 7.31

Hawling Road. Pottery fabric proportions from context 4000

Fabric	Per cent sherd number	Per cent weight
G01	5.9	3.9
G03	2.0	2.6
G07	2.0	4.4
G096	19.6	19.6
G25	21.6	25.8
G28	23.5	22.6
G33	7.8	7.8
O16	2.0	0.4
O26	2.0	0.9
R11	11.8	11.1
W30	2.0	0.9
number	51	774

Table 7.32

Hawling Road. Pottery forms present in context 4000 (by minimum numbers of rims)

Fabric	Forms
G01	G01-J02
G03	G03-J03
G07	G07-J01
G25	G25-J05 (same vessel in 4006)
G28	G28-J07
O16	O16-J02

Table 7.33

Hawling Road. Pottery fabric proportions from ditch [4014] [4009 and 4013]

Fabric	Per cent sherd number	Per cent weight
G01	33.3	28.5
G097	2.6	4.9
G25	10.3	16.5
G28	12.8	6.2
G29	5.1	3.5
G294	2.6	1.5
G32	2.6	4.1
G33	2.6	3.2
G101	2.6	1.7
G101	2.6	5.9
R11	12.8	11.1
R191	7.7	12.1
R38	2.6	0.8
number	39	659

fabric G25, which seems to be the predominant gritted ware by the Hadrianic-Antonine period, provides only *c.* 5 percent. Table 7.52 lists the forms present in the group and Table 7.53 provides a functional analysis of it.

Some 41 percent of the rimsherds show evidence of external sooting and one has internal white deposits, possibly limescaling.

There is one other group, from posthole 533 [534], in this area of apparently Roman date which is (barely) quantifiable. It must be noted, however, that this too contains intrusive(?) post-medieval material in the form of three tile fragments, presumably from the base of ploughsoil. Table 7.54 lists the fabric proportions from 533. The predominant fabric is calcite gritted ware, *c.* 75 percent of the group. Wheel-made fabrics form 9.4 percent of the group and fabric G25 only *c.* 3 percent. A first-century, i.e. Flavian, date might be suggested.

Table 7.55 lists the forms present in the group; three rimsherds, all jars and all externally sooted.

Table 7.34

Hawling Road. Pottery fabric proportions from context 4017

Fabric	Per cent sherd number	Per cent weight
G01	45.3	52.5
G096	3.1	2.0
G25	7.8	3.4
G28	15.6	8.8
G29	14.1	19.8
G291	3.1	7.5
G293	4.7	1.5
G33	3.1	2.1
G101	1.6	2.1
R06	1.6	0.3
number	64	1029

Table 7.35

Hawling Road. Pottery forms present in context 4017 (by minimum numbers of rims)

Fabric	Forms
G01	G01-J10(x2)
G096	G096-J05
G25	G25-J?
G28	G28-J06
G29	G29-J01, G29-J06
G291	G291-J02
G293	G293-J02

Table 7.36

Hawling Road. Pottery fabric proportions from context 4023

Fabric	Per cent sherd number	Per cent weight
G01	1.8	0.8
G03	7.1	3.5
G096	1.8	0.6
G097	1.8	0.6
G25	39.3	26.9
G28	12.5	16.0
G29	23.2	40.4
G293	8.9	5.8
G101	1.8	1.3
R11	1.8	4.1
number	56	780

Table 7.38

Hawling Road. Pottery fabric proportions from context 4030

Fabric	Per cent sherd number	Per cent weight
G01	15.9	4.2
G03	3.2	1.0
G07	1.6	1.3
G25	20.6	23.3
G28	11.1	8.0
G29	26.9	16.7
G291	3.2	0.7
G293	6.3	2.3
G60	1.6	0.5
R06	1.6	3.9
R10	3.2	1.7
R11	4.8	36.3
number	63	1148

Table 7.37

Hawling Road. Pottery forms present in context 4023 (by minimum numbers of rims)

Fabric	Forms
G097	G097-J01
G28	G28-J07
G29	G29-J01
G101	G101-J04

Table 7.39

Hawling Road. Pottery forms present in context 4030 (by minimum numbers of rims)

Fabric	Forms
G07	G07-J01
G25	G25-J02, JG25-J01(x2)
G29	G29-J02, G29-J06
R06	R06-B01
R11	R11-J03

Table 7.40

Hawling Road. Pottery fabric proportions from context 4031

Fabric	Per cent sherd number	Per cent weight	Per cent minimum number of rims	Per cent minimum number of vessels	Per cent rim equivalent
G01	77.7	76.5	71.1	55.9	79.3
G03	0.9	0.6	2.2	3.4	3.5
G07	4.3	3.5	2.2	5.1	2.2
G093	1.5	2.7	-	1.7	-
G096	1.2	0.8	-	3.3	-
G097	1.5	0.9	-	5.1	-
G14	0.3	0.1	2.2	1.7	-
G25	0.3	0.4	-	1.7	-
G28	4.6	6.3	2.2	5.1	1.8
G29	1.2	2.0	4.4	5.1	3.6
G291	0.3	0.8	-	1.7	-
G293	4.9	3.7	8.9	6.8	7.6
G32	0.3	0.6	-	1.7	-
G41	0.3	0.1	-	1.7	-
G52	0.3	0.2	2.2	1.7	-
R11	0.3	0.5	2.2	1.7	1.8
number	328	3900	45	59	223

Table 7.41

Hawling Road. Pottery forms present in pit fill 4031 (by minimum numbers of rims)

Fabric	Forms
G01	G01-J06, G01-J07, G01-J02(x5), G01-J05, G01-J08, G01-J12, G01-J15, G01-J18, G01-J10, G01-J19, G01-J20, G01-J14, G01-J24(x3), G01-J21, G01-J22, G01-J25(x2), G01-J11, G01-B01(x2), AsG01-B01(x2), G01-B02, G01-B03(x2), G01-B04
G03	G03-J02
G07	G07-J03
G096	G096-J01
G14?	G14-J?
G28	G28-J04
G29	G29-B01, G29-J04
G293	G293-J02, G293-J03, G293-J?(x2)
R11	R11-D01
R51	R51-J?

Table 7.42

Hawling Road. Pottery. Functional analysis (by minimum numbers of rims per cent) of vessels from 4031

Jars	Bowls	Dishes	
78	20	(2*)	n = 45

* - probably intrusive

Table 7.43

Hawling Road. Pottery fabric proportions in context 4037

Fabric	Per cent sherd number	Per cent weight
G01	86.8	69.0
G28	4.4	2.5
G291	1.4	2.2
G32	7.4	26.3
number	68	930

Table 7.44

Hawling Road. Pottery forms present in context 4037

Fabric	Forms
G01	G01-J02(x2), G01-J02, G01-J16, G01-B01
G28	G28-J05
G291	G291-J01
G32	G32-J01

Table 7.45

Hawling Road. Pottery fabric proportions from context 510

Fabric	Per cent sherd number	Per cent weight
G01	65.8	60.0
G096	21.1	33.9
G25 *	7.9	4.8
G28	5.3	1.3
number	38	395

* - possibly intrusive

Table 7.46

Hawling Road. Pottery forms present in context 510

Fabric	Forms
G01	G01-J25?, G01-B01
G096	G096-J01, G096-J03
G25 *	G25-D?

* - possibly intrusive

Table 7.47

Hawling Road. Pottery fabric proportions from ditch fill 4032

Fabric	Per cent sherd number	Per cent weight
G01	34.4	27.5
G07	3.1	6.8
G096	6.3	5.2
G097	3.1	9.7
G28	18.8	17.5
G29	12.5	6.5
G293	9.4	11.8
G33	12.5	13.1
R11	6.3	1.8
number	32	382

Table 7.48

Hawling Road. Pottery forms present in context 4032 (by minimum numbers of rims)

Fabric	Forms
G01	G01-J05
G07	G07-J01
G28	G28-J01
G29	G29-D01
G293	G293-J01
R11	R11-J01

Table 7.49

Hawling Road. Pottery fabric proportions from ditch fill 547

Fabric	Per cent sherd number	per cent weight
G01	32.1	15.1
G093	1.8	1.6
G096	1.8	0.2
G25	21.4	19.8
G28	12.5	9.7
G29	19.6	22.7
G33	1.8	1.1
G41	3.6	1.5
G52	1.8	0.8
M15	1.8	25.0
R19	1.8	2.6
number	56	881

Table 7.50

Hawling Road. Pottery forms present in context 547 (by minimum numbers of rims)

Fabric	Forms
G25	AsG28-J01
G29	G29-J03
G41	G41-J01
M15	M15-M01
R19	R19-J01

Table 7.51

Hawling Road. Pottery fabric proportions from context 500

Fabric	Per cent sherd number	Per cent weight	Per cent minimum number of rims	Per cent minimum number of vessels	Per cent rim equivalent
G01	15.3	11.0	11.8	6.7	6.0
G03	1.0	0.2	0	6.7	0
G07	1.3	0.4	0	6.7	0
G093	14.3	5.6	0	6.7	0
G096	32.2	27.2	29.4	16.7	51.0
G25	4.7	9.3	17.6	10.0	7.6
G28	17.9	19.1	29.4	26.7	25.6
G29	3.7	1.5	0	10.0	0
G293	0.7	0.4	0	3.3	0
G294	8.3	19.1	5.9	3.3	2.2
G33	0.3	0.2	0	3.3	0
R35	0.3	0.5	5.9	3.3	7.6
number	301	4100	17	30	316

Table 7.52

Hawling Road. Pottery forms present in context 500 (by minimum numbers of rims)

Fabric	Forms
G01	G01-J09, G01-J10
G096	G096-J01(x2), G096-J04(x2), G096-J02
G25	G25-J02(x3)
G28	G28-J01, G28-J06, G28-J07 (slipped with iron rich clay), G28-J?, G28-D01
G294	G294-J01
R35	R35-J01

Table 7.53

Hawling Road. Pottery. Functional analysis of vessels from context 500 (by minimum numbers of rims per cent)

Jars	Bowls	Dishes	
94	none	6	n = 17

Table 7.54

Hawling Road. Pottery fabric proportions from context 533

Fabric	Per cent sherd number	Per cent weight
G01	75.0	36.9
G25	3.1	1.1
G28	6.3	4.2
G32	6.3	50.9
R191	6.3	3.3
R35	3.1	3.6
number	32	639

Table 7.55

Hawling Road. Pottery forms present in posthole 533 (by minimum numbers of rims)

Fabric	Forms
G01	G01-J03, Similar to G01-J02
G32	G32-J02

PART 4
BROADER PERSPECTIVES

CHAPTER 8

DISCUSSION

In a volume such as this it seems inappropriate to provide a conventional chapter of conclusions. The organization of the text has been such that ideas and discussion have been integrated at appropriate points. Nonetheless, the work presented has provided a variety of new information which has altered perceptions about the region in later prehistory, through the Roman period and beyond. The dissemination of our results through previous publications has already had an impact in drawing attention to some of these ideas. It thus seems appropriate to complete this book with two essays which draw on the results already presented and attempt to place them within a broader historical context in the hope that this will stimulate further work in the future.

8.1 New perspectives on the civitas Parisiorum

by Martin Millett

8.1.1 The Iron Age in the Holme area

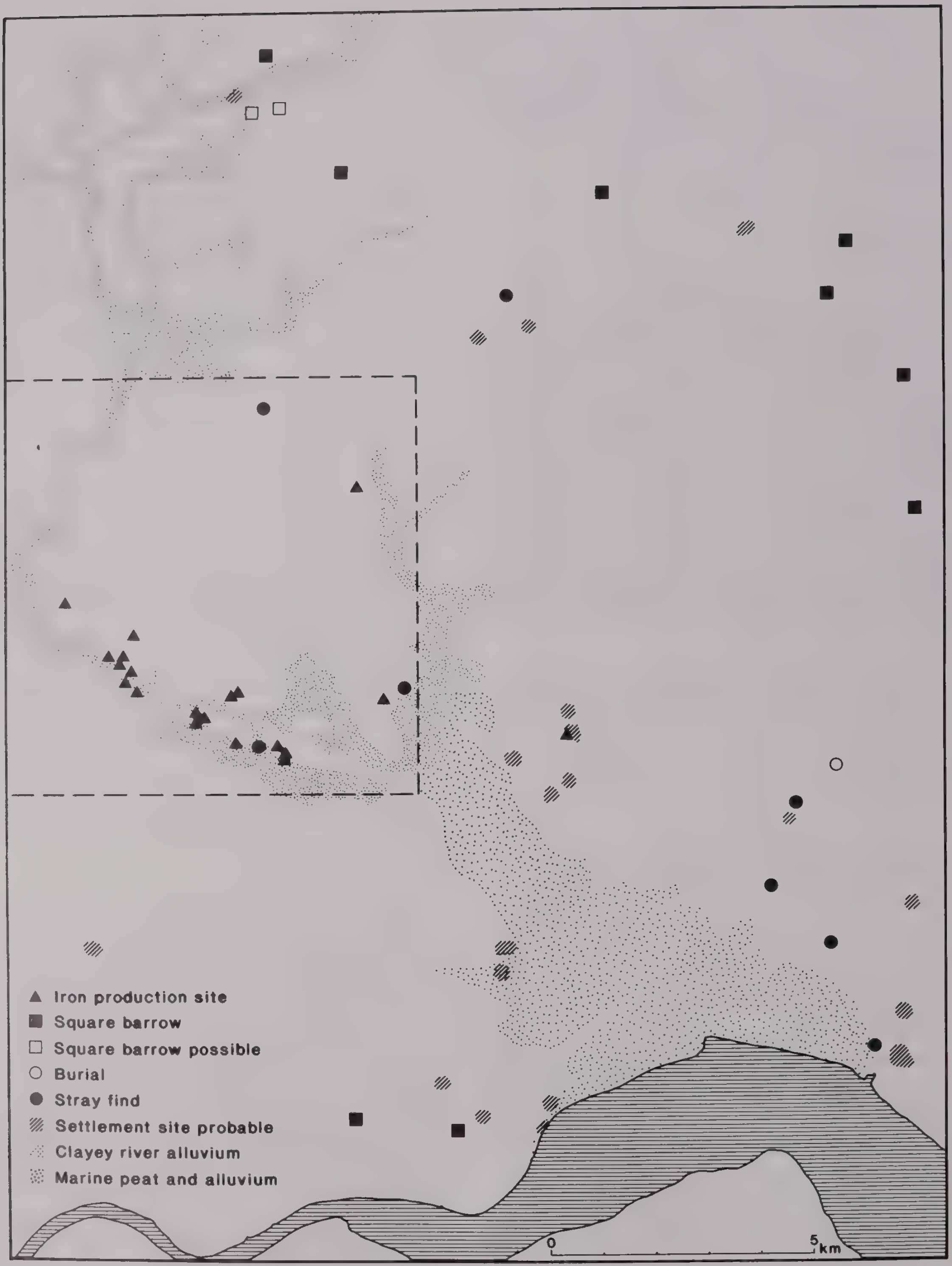
Perhaps the most remarkable result of our sustained field-work in this area has been an increasing appreciation that the landscape in the Holme-on-Spalding Moor survey area was heavily exploited from the Iron Age onwards (Illus. 8.1). There is certainly good evidence for the use of this landscape throughout prehistory (Halkon *et al. forthcoming*) but the limited environmental evidence suggests that occupation did not involve the wholesale clearance of woodlands. Thus the pollen diagram from Hasholme (Turner 1987) suggests that the region was characterized by a pattern of managed woodland by the middle Iron Age.

The wet and low lying character of the land with its slight but significant variations in altitude and soil type created an environment which constrained settlement. In general sites were confined to drier land on the higher sandy ridges with a preference for situations close to the creek system which dominated the area. This pattern becomes most evident in the Iron Age as the quality of the aerial photographic evidence of this period enables us to map the settlement pattern. We should nevertheless be cautious about assuming a major intensification of settlement during this period. We know from stray finds (Halkon *et al. forthcoming*) that there was earlier settlement at several sites although most only become archaeologically visible when the enclosures which appear on the aerial photographs were constructed during the Iron Age. In the absence of commonly occurring and durable finds like pottery it is extremely difficult to fully map earlier phases of settlement through field-walking. Indeed, the discovery of an aceramic, undated and unenclosed settlement phase at Bursea Grange (above Chapter 3.2) should serve as an important caution to remind us of what we may be missing elsewhere. The scale of the Hasholme logboat (Millett and McGrail 1987) equally shows the cultural achievement of the period when settlement first becomes clearly visible in these low lying areas (Illus. 8.2).

Although the date of the emergence of the enclosed settlements of the later Iron Age remains uncertain it is clear from the aerial photographs that known sites show an evolution which suggests development through a sustained period. Chronological fixed points are provided by the sixth-third century B.C. radiocarbon dates from Welham Bridge (Table 4.1) and the dendrochronological date of 322-277 B.C. for the Hasholme logboat (Millett and McGrail 1987). Radiocarbon dating equally shows that the marine transgression which created the tidal inlet which dominates the study area occurred after a date in the range 810-530 Cal. B.C. Given the important influence of this inlet on the development of settlement in the area it is arguable that the visible Iron Age occupation predominately post-dates the transgression. Any refinement of this chronology would demand much more excavation. Even that might be inconclusive given the apparent scarcity of pottery from the excavated sites in the study area.

The navigable inlet had a considerable influence on settlement, influencing both the location of the known sites and their individual layouts as shown on the aerial photographs. It is particularly noticeable that several enclosures have entrances which face the water's edge reinforcing the notion that boats were important for transport. In contrast to some other areas of lowland Britain the pattern of settlement which emerged does not suggest large scale landscape organization. There is perhaps some suggestion of land allotment in the field enclosures associated with the unenclosed settlement at Bursea Grange (above Section 3.2.5) but most of the evidence is of a variety of enclosure types surrounded by areas apparently devoid of fields. The most probable explanation for this pattern is that the area was dominated by managed woodland interspersed heathland, with small parcels of arable and stock enclosures. The later Iron Age landscape in the Holme area was thus most likely dominated by enclosed settlements on the drier land in clearings amongst the woods.

The evidence from both the field-walking and the excavation at Welham Bridge illustrate the scale of iron production within this landscape. It seems most likely that smelting was based on the exploitation of locally occurring bog ore found in the extensive wetlands. Analytical work has demonstrated that the use of this ore for smelting was likely



Illus. 8.1 *Map showing the distribution of Iron Age sites in broader study area and the Holme-on-Spalding Moor landscape block incorporating information from the former Humberside Sites and Monuments Record*

(above Section 4.3.3). However, exhaustion of these ore sources through exploitation has robbed us of proof.

The scale of production demonstrated at Welham Bridge is relatively large (above Chapter 4.4) especially when seen in the context of the other nineteen such production sites known in the study area alone (above Section 2.3.5). The consequences of the scale of production for our understanding of the landscape become clearer if we look at the demands for both ore and charcoal, the fuel needed for this iron making. The extraction of ore from boggy locations would

Illus. 8.2 *Photograph showing the logboat excavated at Hasholme in 1984. For location see Illus. 2.12. (Photograph by Martin Millett)*

probably have been undertaken seasonally in the summer and no doubt required both a considerable labour force and detailed empirical knowledge of its occurrence. Charcoal was most likely manufactured from the product of locally managed woodland but this will equally have demanded a skilled and knowledgeable workforce.

Rackham (1980, 108) used a figure equal to approximately 5 tonnes of wood for the annual yield from one hectare of coppiced woodland. Cleere (1976b, 240-41) suggested a product of 1 tonne of charcoal from 7 tonnes of hardwood, based on extrapolation from the product of modern retorts (as illustrated by Kelley 1986, 28). The assumption that past charcoal burning was almost as efficient as modern practice is perhaps optimistic and may result in an underestimation of the area of woodland needed to support the charcoal production. Even so, these figures do provide an important indication of the scale of resources used. Using these figures we can suggest an annual product of 710kg of charcoal per ha of coppiced woodland. On this basis, the estimated 33,600kg of charcoal needed to produce the Welham Bridge slag heap (above Section 4.3.4) represents the annual product of 47.32ha of woodland. This figure needs to be related to the length of period of operation of the site which remains unknown. A more useful insight is perhaps given by looking at the charcoal requirements represented by the individual furnace bottoms recovered. The smallest of the Welham Bridge furnace types (Table 4. 2 group 1, plano-convex type) weighed an average of 12.68kg which represents the product of approximately 78.86kg of charcoal, the annual yield from about 0.11ha of coppiced woodland. At the other extreme the largest of the regular furnace types (Table 4.2 group 3, hemispherical type) weighed an average of 45.75kg, representing the product of 284.56kg of charcoal or the annual product of 0.40ha of coppiced woodland. All these figures assume an optimum and efficient use of resources and should thus be seen as minima.

These areas of woodland appear comparatively modest but in aggregate the iron production would have stimulated a significant demand for fuel. This demand seems most likely to have been satisfied through local production which would have required the maintenance of significant areas of coppiced woodland. Without any knowledge of the duration of use of iron production site at Welham Bridge or the coppicing regime practised it is impossible to provide estimates of this impact on the whole landscape. Even if production took place on a small scale over a long period the management of the woodland and the production of the charcoal would have been relatively labour intensive. The figure provided by Rackham (1980, 108) suggests that an individual woodcutter could cope with cutting approximately 20ha of coppiced woodland. On this basis the woodcutting alone for a single firing of a large furnace would have required a week's work for an individual. The additional time needed to convert this to charcoal is uncertain.

There is little specific environmental evidence to set alongside the landscape and industrial evidence of the Iron Age which would help us place the iron manufacture into its context. Two extreme scenarios can be provided to explain the evidence. In one we envisage iron production on a substantial scale with smelting exploiting then exhausting successive bog ore deposits along the inlet before moving to the next location. According to this interpretation production was specialist and the different sites represent successive phases of exploitation, each being abandoned once the producers moved on. Woodland exploitation could thus have been opportunist as timber was cut from fresh areas as the industry migrated along the valley. At the other extreme sites were occupied contemporaneously but on a small scale over a long period of time with the iron production being integrated into an economic strategy in which the inhabitants of each settlement engaged in a variety of productive activities including small scale mixed farming, woodland management, charcoal burning and the smelting of iron.

Both explanations are plausible although neither is entirely satisfactory. On balance the evidence tends to favour the idea of long-term small scale production integrated into a mixed economic strategy. Such a niche economy would be consistent with Iron Age settlement evidence which implies the evolution of the enclosed settlements but it would be a serious mistake to confuse its small scale with subsistence production or low levels of technical skill. Operating iron furnaces demanded a specialist knowledge which was arguably kept confined within a small community. Surplus iron was certainly produced by the region and although we have no knowledge of the metal's contemporary worth we can be fairly secure in assuming that it was relatively valuable. Iron is after all a relatively rare find on excavated Iron Age settlements and cemeteries.

It would not be inappropriate to link exchange in iron with several aspects of the Hasholme logboat. First, it may be noted that the boat itself was not simply a functional vessel but displayed features which are best understood in terms of status display (Illus. 8.2). Second, the cargo found with the boat included sides of beef which were presumably being traded (Millett and McGrail 1987, 145-49). Finally it seems that her scale was sufficient to have carried a substantial load of iron (McGrail 1988). This evidence suggests that exchange with other parts of the region was important and deployed vessels designed to emphasize the status of their owners. The direction from which the boat was travelling when it sunk is unknowable, but it would not be surprising given the nature of the landscape in the study area, if the meat were the product of exchange with better cattle raising land elsewhere. It is certainly arguable that the boat represents trade in the other direction with its timber and meat being taken downstream. However, it would probably be a mistake to use evidence from more recent periods to support the notion that the Holme area sustained large scale cattle rearing. First, the higher water level and estuarine conditions would have meant that the areas available for seasonal pasture were very much more restricted than in the post-medieval period. Second, the scale of the enclosures known from aerial photography suggest small scale mixed farming rather than large scale, specialized herding.

On this basis we might speculate that economic specialization was confined to iron manufacture with the metal exchanged with agricultural produce from elsewhere. Given the soils in the Holme area, it would arguably have made better sense to concentrate on woodland management and iron production than to attempt larger scale farming. A key point which supports this is that agriculture could have been practised anywhere; iron could only be found in a few localities. This would also be consistent with the absence of field systems associated with the settlement and the scarcity of arable seed evidence from sampled contexts.

The favoured reconstruction of the economy as based on a small scale economic niche does not suggest the total absence of arable production or animal rearing. Rather, we should perhaps see each settlement having a mixed economy which included the raising of animals and the production of grain to meet basic needs. Using Classical consumption figures for subsistence needs and the Butser grain production estimates (Millett 1990a, table 3.2; cf. Kreuz 1995, 79-80) we can suggest that a settlement with 10 adults perhaps needed only 2-5ha of arable land to support its requirements. In later periods wooded areas were very important for the grazing of domestic animals. In the absence of good groups of excavated animal bones we know nothing of this aspect of the economy. The wet ground may have discouraged the raising of pigs and sheep but cattle are highly likely to have been kept in the woods. We can thus perhaps envisage each settlement being surrounded by small areas of cultivated land as well as tracts of managed and grazed woodland.

In summary, we can see the Iron Age landscape of the Holme area as focused on the tidal inlet with relatively long lived enclosed settlements on the higher, drier ridges. These settlements were perhaps occupied by small communities engaged in mixed agriculture and woodland exploitation combined with the extraction and smelting of bog iron ores. The latter work was probably undertaken on a modest scale over a sustained period with the products exchanged with surrounding communities for goods not easily produced in the region. As such the society of this lowland area probably shared wide cultural contacts with those living in the surrounding areas.

8.1.2 The Iron Age beyond Holme

There are evident contrasts between the Iron Age in the Holme-on-Spalding Moor area and that seen elsewhere in East Yorkshire. The type of settlement discussed in the last section is different from that sampled on the Hawling Road site. Here we appear to have evidence for a more open landscape with grassland used for grazing beyond the more wooded stream margins (above Section 7.3.1). The settlement site comprised an enclosure, arguably little different in form from some of those found in the Holme area. However, the finds from the site suggest a more conventional lowland Iron Age economy based principally on mixed farming. The finds assemblage also contrasts with those from sites in the Holme area as it shows a wider use and variety of ceramics. Although the Hawling Road site is by no means rich in artefacts there are suggestions of a marked differentiation between it and the Holme area only 5km to the south-west.

The Hawling Road site seems to have more in common with other Wold foot sites in the area (for instance that currently under excavation at Hayton; Halkon and Millett 1996; Halkon *et al.* 1997). This is undoubtedly partly a result of the nature of the landscape. Although the Hawling Road excavation lay on a sand ridge it was situated at a higher elevation above sea level than the Holme sites and close to the foot of the Wolds. The ecology of its location also contrasts with that of the Hayton site which is situated on significantly better land. However, both enjoy situations which would have enabled the population to exploit the very varied habitats created by the different geological outcrops in the area where the land starts to rise towards the Wolds (Illus. 1.3). The more elevated ground also provided for easier communications, both with the Wolds and around the edges of the Vale of York. These factors perhaps encouraged greater social interchange whilst the character of the land facilitated better agriculture. We can thus perhaps see a distinction between the areas growing out of the varying modes of ecological adaption. However, it should be stressed that the emergence of more specialized exploitation in areas like that around Holme will have increased economic interdependence within the region.

The nature of communications may also have contributed to the marked variations between the two areas. The Hawling Road site was well located for easy integration with society in the rest of East Yorkshire. In this respect, although in the Vale of York, the site might be considered to be on the margins of the so-called 'Arras culture' of the Wolds best known from its distinctive burial rite (Stead 1979). It is clear from Illus. 8.1 that our study area lies right on the edge of the distribution of the square barrows which provide a type-fossil for this group. It should be noted, however, that the major barrow cemeteries like that at Arras are located at the head of a valley so that they would have been visible on the sky-line from the lowlands of the Vale. Thus although separated from settlements like that at Hawling Road they are very likely to have been closely linked socially.

By contrast, the sites in the Holme area would have experienced much greater difficulty in communicating with inland areas as the easiest form of access was almost certain via the Foulness valley and the tidal inlet of Walling Fen (Illus. 8.1). Communication by water would have led naturally to the Humber where landings in the vicinity of Faxfleet (Sitch 1990) and Redcliff (Crowther *et al.* 1990), or South Ferriby and Old Winteringham (Creighton 1990) on the south bank will have provided links to overland routes. Connections with these more distant areas on the Humber are thus likely to have been stronger than with those closer to the north. This perhaps explains the presence of Dragonby-type pottery at Bursea House (Illus. 5.39, no. 9.1) and the more general ceramic contacts which later suggest links with north Lincolnshire (above Section 7.4.4).

This difference in directions of contact has a two-fold significance. First, they perhaps provide some explanation for the marked distinction between the two parts of the study area, and indeed between the patterns observed around Holme-on Spalding Moor and those noted on the Wold sites themselves (Dent 1982). Second the communications link with Redcliff in particular may help to account for its development at a location on the margin of Iron Age settlement in East Yorkshire (cf. Millett 1990b). Redcliff, and its successor settlement at Brough-on-Humber (*Petuaria Parisiorum*), are unusual in location when compared to other probable tribal centres of the period since they lie on the southern boundary of the territory of the *Parisi* (at least in the Roman period). The explanation for this location has previously been assumed to result from factors like trade with the south or the military control of the Humber during the Roman invasion.

Although we need to exercise some caution because of the late Iron Age date of the excavated site at Redcliff, a strong case can be made for the importance of that area from the Bronze Age onwards because of the concentration of boat finds from around North Ferriby which are now dated to the period from around 1500 down to 400 Cal. B.C. (Switsur and Wright 1989). Once it is recognized that this location forms both a natural point of contact with the iron producing areas of the Foulness valley and the origin for routes north onto the Wolds and around the edge of the Vale of York we can arguably see its origin in terms of the indigenous East Yorkshire settlement pattern rather than as a consequence of being situated on the route across the Humber to the south. Redcliff undoubtedly grew as contacts with the south became more important in the early years of the Roman province but a case can now be made for it being a convenient centre for the development of exchange within the Yorkshire Iron Age.

If this speculation is correct it is likely that the iron produced in the Holme area was exchanged with goods from the Wolds and beyond arguably accounting for some of the great wealth expressed in the burial rituals on the Wolds (cf. Stead 1991). In this sense, although geographically peripheral, the scale of iron production in the Holme area makes it central to any understanding of the Iron Age of eastern Yorkshire.

8.1.3 The Roman period in the region

The Roman conquest of this area took place around A.D. 71-72. Apart from the construction of forts at Brough-on-Humber and Hayton no immediate effects are visible. Creighton (1990) has however demonstrated how the presence of a Roman frontier at the Humber had already reorientated patterns causing shifts in the importance of key settlements. These subtle changes together with the formalization of the route along the Wold foot into the Roman road from Brough-on-Humber to York had a marked impact on parts of the region and subsequently became the focus of a considerable amount of new settlement (below Section 8.1.4). I have previously argued (1990a, 54) that the incorporation of East Yorkshire into the Roman province was comparatively peaceful. Furthermore, it seems likely that the creation of the *civitas Parisiorum* as the administrative unit for Roman control resulted from a direct transfer of power from the army to an already existing tribal élite. The date of this transfer of power remains highly uncertain, partly because of our limited knowledge of Brough-on-Humber which I would argue became the *civitas* capital. Wacher (1995, 394-401) remains sceptical about its identification as the *civitas* capital (although he makes no reference to recent work at the site). One possible date for a transfer of power to the native community was perhaps in the later 70s when the fort at Brough was abandoned (Wacher 1995, 398). That at Hayton was arguably vacated at the same time (Johnson 1978, 78). Civil government was certainly established before 140-44, the date of the Brough theatre inscription (R.I.B. 707). The presumably native-born magistrate who presented a new stage to the theatre as commemorated in this inscription had been granted Roman citizenship and bears the name Marcus Ulpius Januarius. His name clearly suggests that he obtained his citizenship from the emperor Trajan (M. Ulpius Traianus, A.D. 98-117) and this perhaps happened at the same time as the *civitas* was established. Although the town does not appear to have developed as a major centre of Roman-style town life it did come to form the focus of a group of villas (Illus. 8.3; cf. Millett 1990b, fig. 25.2).

The growth of settlements along the new road at Shiptonthorpe (Millett 1992) and Hayton (Halkon *et al.* 1997) illustrates how settlement in the area changed during the decades after the conquest. Hayton grew from the later first century but Shiptonthorpe seems to have developed later in the second century. The finds assemblage from Shiptonthorpe was strongly Romanized from the outset in contrast to that from Hawling Road which remained dominated by ceramics in an Iron Age tradition into the second century (above Section 7.4.4). Later the Hawling Road site certainly had stronger contacts with the Romanized economy as shown by the wider range of pottery types and the small collection of later Roman coins found (Section 7.4.3). Nevertheless the general impression is that there was a marked contrast between the economy of this site and that seen at Shiptonthorpe only 2.5km away. This contrast is less marked than that between both settlements and those around Holme-on-Spalding Moor.

8.1.4 The Roman period in the Holme area

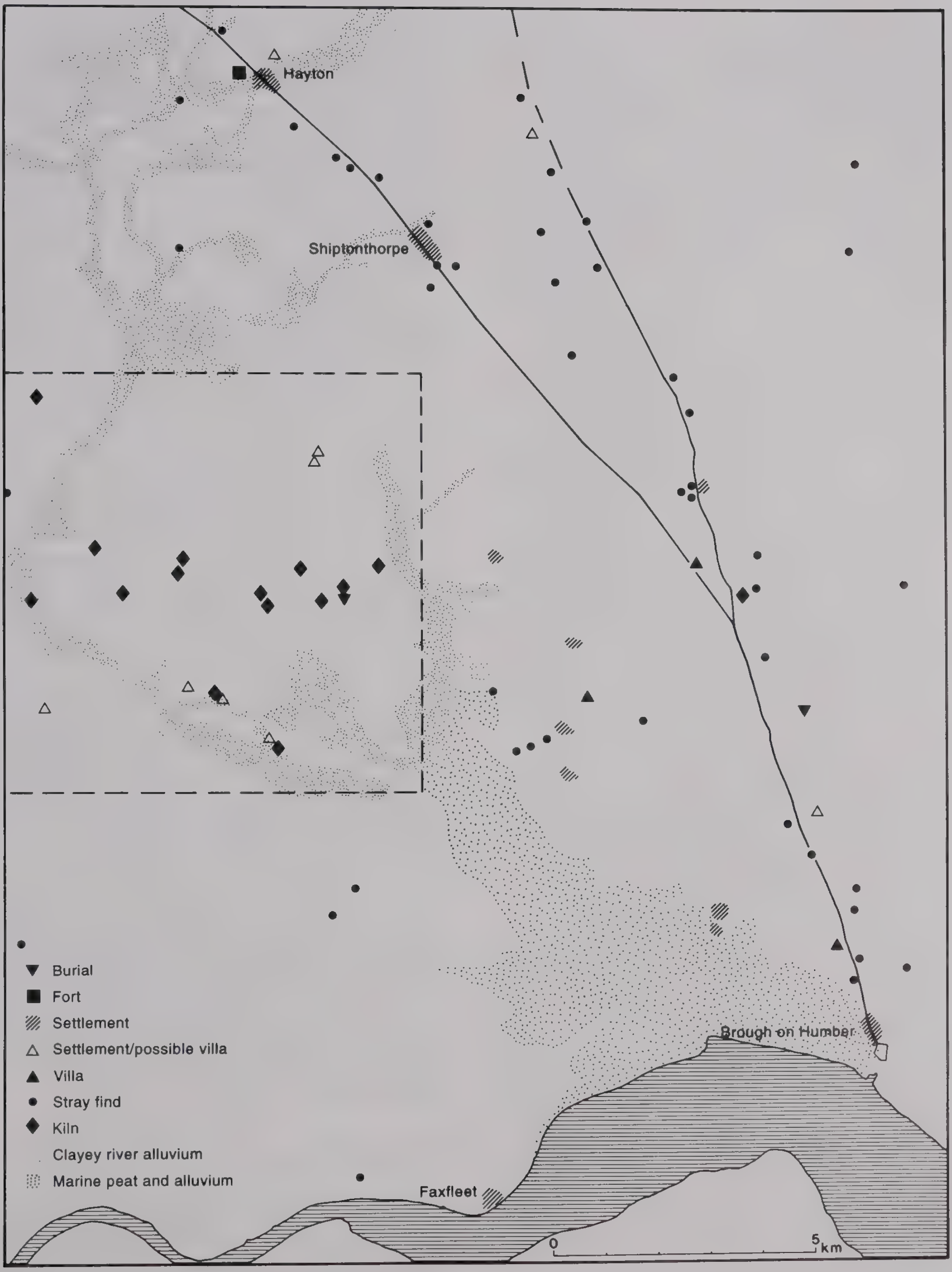
In the Holme-on-Spalding Moor area there is very little evidence for any substantial change in settlement during the Roman period. The aerial photographic evidence perhaps suggests further growth in settlement through the creek system with multiple enclosures becoming the dominant settlement type. The excavated evidence supports the idea that this represents a continued evolution. Little imported material reached any of the sites until the later Roman period and then only one site near Holme village (Gazetteer no. 134) produced a non-local assemblage of any size. In contrast with areas like those around Brough or along the Roman road at Shiptonthorpe and Hayton there are few known Roman coin finds and no villas (Illus. 8.3). Given the intensity of our fieldwork this seems most likely to result from a genuine absence of such items and suggests a lack of effective integration of the Holme area into the emerging Roman economy.

The principal development witnessed through the period was the emergence of a coarse pottery production industry. This grew up during earlier third century and its kiln types show similarities with the industries of north Lincolnshire (above Section 5.3.2). As Evans has noted (1988; 1991) there was a remarkable distinction between the pottery supplied to sites in East Yorkshire and that found in other parts of the North. Holme products form a important component of the East Yorkshire assemblages, forming a significant proportion of groups in the southern part of the *civitas* during the third century and spreading further northwards during the fourth. Production probably continued into the later fourth century although the scale of distribution was reduced (Evans 1985; 1988; 1991).

The genesis of the industry is difficult to assess. The similarity of kiln types to those found in Lincolnshire may suggest inspiration from that direction but the parallels may simply reflect the historical links between these two areas (above Section 8.1.2). One marked characteristic is the continuity of industrial production from the Iron Age. Although the work published in this volume has effectively disposed of any idea that glass was produced in the area, we can speculate that there was a link between iron production and potting. Both were based on furnace technology, drew on local raw materials and required significant amounts of fuel which could be produced through woodland management.

The evidence suggests that limited iron production continued into the Roman period although it was in decline, most likely because of the effective exhaustion of the ore sources which are unlikely ever to have been particularly extensive. A sequence of development is clearly supported by the distribution evidence (Illus. 2.24 and 2.25) which shows clearly how the principal iron manufacturing sites are found separately from the later pottery kilns. This perhaps suggests that large scale iron smelting was undertaken outside settlements, and that by the early Roman period iron production was confined to a smaller scale and undertaken intermittently within settlements. An attractive hypothesis suggests that there was a technology transfer, with knowledge from iron furnace technology being adapted to potting. Thus small scale local ceramic manufacture started first alongside iron working, with production being raised to a more industrial level only around the beginning of the third century as the iron resources finally ran out. According to this model first iron, then pottery were produced effectively as a cash crop to enable those living in the Holme area to raise capital to pay their taxes. There can be no doubt that the population would have been subject to taxation, whether it was collected in cash or kind. Given the limited agricultural potential of the area, the production of manufactured goods from local raw materials may have provided the best way for local communities to meet their obligations. The general absence of coinage from the area of the kilns might imply taxation in kind but could also indicate some more complex form of tribute collection whereby goods were traded for cash by those other than the producers (such as a land owner) who paid the taxes on their behalf.

The scale of pottery production seems to have been relatively modest and on a wholly domestic scale (cf. Peacock 1982) at sites like Bursea House and Hasholme, although it



Illus. 8.3 *Map showing the distribution of Romano-British sites in broader study area and the Holme-on-Spalding Moor landscape block incorporating information from the former Humberside Sites and Monuments Record*

may have been more substantial at Throlam where the floruit of manufacture appears to have been in the fourth century (above Chapter 2.4). Even here very large scale manufacturing seems unlikely. Furthermore, the kilns are dispersed across the landscape, located within or beside many of the settlement sites suggesting that pottery was produced by individual groups of inhabitants rather than as part of any large scale organized industrial complex. This does not imply any lack of skill on the part of the producers whose products clearly satisfied the demands of some far flung consumers.

The environmental evidence from Bursea House (above Section 5.3.6 and Chapter 5.5) shows that the landscape continued to be dominated by wetland species and woodlands which were most likely managed to produce fuel. The charcoal from the kilns at Bursea House demonstrated the use of round wood from a variety of species as fuel (Table 5.5). If the surviving charcoal is representative, it suggests a pattern of coppiced woodland dominated by willow and alder. The stem diameters recorded are consistent with a short cycle of coppicing for most species (Rackham 1980, 142), although there are indications of a longer cutting cycle for the oak. Given the scale of the woodland areas which are likely to have existed between settlements we should certainly not overlook the economic potential of this land. Not only charcoal but a whole range of other woodland products may have been produced for exchange (cf. Sparkes 1977). It is important to appreciate that the production of pottery (and indeed iron) may not have been seen as conceptually different from other woodland crafts.

At the outset of the project we had hoped to establish whether the pottery production was seasonal. The evidence has not proved sufficient to establish this although we can speculate that potting was probably undertaken alongside woodland crafts and small scale mixed farming. Wood cutting is best undertaken in the winter when the sap is down and potting was probably more appropriate to the spring and autumn months. Such organization would have enabled labour to have been used effectively through the seasons and can be seen as a logical growth from the niche economy that existed during the Iron Age. A development of this might have been the emergence of different settlements with particular specialisms like the larger scale of pottery production at Throlam in the fourth century.

The presence of pottery manufacture in the area has had a marked effect upon the nature of the archaeological evidence as field-walking has revealed a widespread distribution of the locally manufactured pots. This represents a significant change from earlier periods when the area may have been largely aceramic. It could be argued that this widespread distribution marks a radical increase in the density of occupation. Instead it seems more likely that the increased circulation of pottery simply made existing settlements more archaeologically visible. The overall density of sites in the Holme survey block is not inconsistent with those observed in other closely studied areas elsewhere in Roman Britain (Millett 1990a, table 8.3) suggesting that although a rural backwater, the Holme area was intensively exploited.

A relative change in sea level, probably in the earlier Roman period, mean that the inlet which had dominated the geography in the later Iron Age, gradually ceased to be tidal. We cannot be sure of the effect that this had on the watercourse but it is possible that it became increasing boggy and less easy to use for navigation. Equally, parallels from elsewhere suggest that such changes in drainage may have caused localized flooding further up the valley, leading to increased bogginess and resulting in difficulties for settlement and communications (Taylor *pers. comm.*). A result of this may have been to turn the geography of the area to face northeastwards to Shiptonthorpe rather than towards the Humber. This would have effectively meant that Shiptonthorpe or an adjacent roadside settlement came to form the link to the rest of the region. These roadside sites had already changed the settlement geography of the region by the middle of the second century and had become dominant sites. Changes in the geography of the Foulness valley may perhaps have enhanced their importance, but probably also made the waterside parts of the Holme area increasingly remote during the later Roman period.

Nowhere on the sites considered in the present study do we have good evidence for the development of settlement at the end of the Roman period. Pottery production certainly declined.in the later fourth century, perhaps as the taxation system collapsed. In the absence of pottery, sites are not easily found by field-walking and effectively disappear from the map. This does not suggest that the area was abandoned and it would seem more likely that the best ridge top locations continued to be occupied down to the medieval and modern periods. The challenge of investigating this period in detail lies beyond the scope of the present fieldwork although a general review of the evidence from the region provides a fitting epilogue to this volume.

Acknowledgements

The ideas in this section have been tried out on various local audiences during the past two years. I am grateful to those who listened for their very helpful questions. Jeremy Taylor and Peter Halkon have kindly read and commented on an earlier draft. Whilst they do not necessarily agree with the points made, I am most grateful for their comments.

8.2 Archaeological expressions of the transition from the late Roman to early Anglo-Saxon period in Lowland East Yorkshire

by Chris Loveluck

8.2.1 Introduction

The late Roman and early Anglo-Saxon remains from lowland East Yorkshire present an immediate contrast in forms of archaeological evidence, forcing any attempt at interpretation of the social transformations of the fifth-sixth centuries to be approached through the use of reflections of contrasting aspects of human behaviour. The vast majority of late Roman remains come from settlements, while no late Roman cemeteries have been identified in the area with the exception of an isolated extended inhumation in a stone cist at Hessle (Elgee and Elgee 1933, 181). Nearly all early Anglo-Saxon remains, however, have been recovered from cemeteries. The sites of Anglo-Saxon settlements are known but none have been extensively excavated in this part of Yorkshire. To some extent, the lack of knowledge concerning the mortuary practices of the late Roman population and the absence of extensively excavated Anglo-Saxon settlements makes any attempt at understanding fifth-century changes in the landscape, economy and society a matter of speculation. Nevertheless, for the purpose of the following attempt at explanation, it is perhaps best to begin with an appreciation of the existing late Roman and early Anglo-Saxon archaeological remains. Once these have been discussed with some reference to the chronology of the latest datable occupation evidence on Romano-British settlements and the earliest remains from Anglo-Saxon cemeteries, suggestions can be made to explain the social and economic transformations which took place in lowland East Yorkshire during the intervening period, when absolute chronological markers are absent from the archaeological record.

8.2.2 Lowland East Yorkshire at the turn of the fifth century A.D.

If the *civitas* of the Parisi still survived as a social and territorial entity at the turn of the fifth century it seems to have functioned without an urban settlement focus. At Brough-on-Humber, the *civitas* capital of the Parisi, it is difficult to date any occupation within or in the vicinity of the town after the mid-fourth century. The latest stratified coins are those of the emperor Valentinian (A.D. 364 -78), although a single coin of Magnus Maximus, dating to the 380s has also been attributed to the town (Jallands 1990, 41). Wacher and Whitwell have suggested that the town had ceased to be a major settlement focus by the mid-fourth century, after the silting up of its harbour and a change of currents in the Humber, towards the south bank of the estuary (Wacher 1969, 26-27; Whitwell 1988,70). The town was not necessarily abandoned at this time but there is no doubt that by the late fourth century, the character of occupation was not urban. The lack of coinage after the 380s and the presence of later coinage on other settlements in East Yorkshire suggests that Brough had lost its role as the administrative and tax-gathering centre of the *civitas* during the last decades of Roman rule.

By the early fifth century, the physical characteristics of villas in the region had also undergone a change. At villas such as Brantingham, in the hinterland of Brough, architectural features were not being replaced in a Romanized manner after the mid-fourth century. Provisional interpretation of the structural remains led the original excavator to suggest that the villa had been abandoned by the middle of the fourth century, correlating with ideas on the decline of Brough. However, re-assessment of the remains and the recovery of coins of the House of Theodosius (A.D. 395-402) indicate that occupation of the villa settlement continued into the fifth century (Whitwell 1988, 64-65). Other villas in East Yorkshire have also produced coinage of the House of Theodosius, such as Langton and Beadlam in the Vale of Pickering and Howardian Hills, though they too underwent a 'de-Romanization' of architectural styles (Ramm 1978, 132; Loveluck 1994, 131). This change in the physical character of these settlements may reflect either an inability to replace structures in a 'Roman' manner or it may reflect the growth of a stronger provincial identity, resulting from the greater self-sufficiency of the Diocese of Britain during this period (Millett 1990a, 163). The presence of the latest coinage on these settlements and their absence at old administrative and military centres, such as Brough and Malton, suggests that tax collection had devolved on to the native elite, based on their rural estates, with little reference to the infrastructure of the Roman state in East Yorkshire as it had existed in the early fourth century.

Other than villas, the most important settlement form in the late Roman landscape of East Yorkshire was the nucleated 'ladder' settlement. These have been identified in large numbers on the Wolds, around Driffield and on the south-western edge of the Vale of York. Field-walking, excavation and metal-detected finds from two or more of these settlements at Shiptonthorpe and Hayton on the Roman road from Brough to York, have indicated that these settlements were still occupied at the point when the latest intrinsically datable Roman artefacts - coins of the House of Theodosius - were still in use (Taylor *pers. comm.*; Sitch *pers. comm.*). This is also the case at a partially investigated example at Elmswell, near Driffield (Wade 1940, 62; Loveluck 1997). These sites were founded during the first century and were continuously occupied through the Roman period. For much of that time the nucleated settlements were defined by a series of consecutive ditched enclosures. The enclosures of the Shiptonthorpe settlement were aligned along the main Roman road from Brough to York. It is less clear whether this is also the case at Hayton. At Elmswell, the settlement seems to have been aligned on a track and was bounded to the south by a linear boundary feature, one of a series common on the Wolds (Congreve 1937, fig. 1; 1938, fig. 1). At Shiptonthorpe, where two of twenty-three enclosures have been excavated, a series of individual farm units are indicated within the enclosures but not all of them appear to have been occupied. Phosphate, magnetic susceptibility and geophysical survey indicate that some may have been used for horticultural purposes (Taylor 1995). In the final phase of the Shiptonthorpe settlement, there was a significant change in its morphology to a settlement unenclosed by ditches, though fences and hedge boundaries may have existed. The original enclosure ditches had silted up or had been infilled. The succeeding settlement phase was also situated on a new alignment, not respecting the line of the Roman road to the same degree as its predecessor (Millett *pers. comm.*). The silting up of enclosure ditches and their abandonment is also suggested at Elmswell which also seems to have been unenclosed during its final phase (Corder 1938). Consequently, the early fifth century, this settlement type had evolved into a less formally planned, agglomerated settlement form of a series of farming units.

The presence of the latest Roman coin issues on these sites indicates that they were fully integrated into regional exchange networks, being in receipt of the latest mass-produced Crambeck wares and Huntcliff types. They practised mixed agricultural strategies, although evidence of craft specialization is varied. At Shiptonthorpe no particular craft specialist activities are indicated, while at Elmswell iron-working seems to have been important to the economy of the settlement (Congreve 1938, 21; Smythe 1940, 29). The relationship of these settlements to villas is unknown. Millett has previously suggested that they may have been tied settlements within villa estates (Millett 1990a, 210-11), but he also stressed that to view these settlements as completely subordinate to villas may underestimate their importance within the landscape. More isolated farmsteads also existed but none have been excavated in lowland East Yorkshire. However, a number are known from aerial photographs (Johnson 1978, 59; Taylor this volume). Fortunately, a single Romano-British farmstead was excavated by Brewster, between 1947 and 1954, at Newham's Pit near Staxton, although the site is situated in the Vale of Pickering. This had been continuously occupied through the Roman period and consisted of a native-style double-ditched enclosure with a series of huts within. The character of the buildings in its final phase is unclear but it is certain that the enclosure ditches had been allowed to silt up by the time of the final datable Romano-British phase, dated to the middle of the fourth century by an Argonne ware ceramic bowl, from north-eastern France (Brewster 1959, 211). There is no evidence, however, for the abandonment of this farmstead, indeed, its final phase is marked by the deposition of Anglo-Saxon pottery and a set of wrist clasps in the uppermost fill of the silted enclosure ditches (Brewster 1959, 208).

As a general impression, late Roman economic links in East Yorkshire are centred on regional and inter-regional links with areas within the Diocese of Britain. By the late fourth century, Crambeck wares and Huntcliff types indicate a reliance on regional finewares, long-distance contacts diminishing in scale through the fourth century. Imports such as Argonne ware are exceptional and are only found in several instances (Brewster 1959, 211). Taking the evidence from villas, nucleated settlements and farmsteads together we see a growing provincialization of the economy and of society, with a reliance on indigenous products. The only consistent evidence for the maintenance of long-distance exchange links comes from the importation of the latest Roman coin issues from Gaul (Fulford 1978, 66). If a further regionalization of production and exchange can be envisaged by the early fifth century, a continued reduction in the organization of production can be inferred from the limited evidence for the furnishing of the native cist-burial tradition into the fifth century. A number of inhumation burials in stone cists were recovered at Crambeck - Castle Howard, in the west of the Vale of Pickering (Corder 1928, 11-12). A series of cist graves were found during the nineteenth century and Corder found two further examples in his excavations. They were cut into a Crambeck ware kiln which Corder considered to have been disused for some considerable time prior to the foundation of the cemetery. The kiln, however, was associated with the latest mass-produced Crambeck forms, dated to the late fourth-early fifth century. The graves had therefore been constructed sometime later in the fifth century (Corder 1928, 18-19). In addition, one of the inhumations was accompanied by a unique wheel-made Crambeck ware vessel, which seems to indicate that wheel-made Crambeck ware was still produced for an unknown period, on a local level, after its large scale production and distribution had ceased (Loveluck 1994,133).

It is not possible to identify continued occupation on late Roman settlements after the arrival of the latest Roman coin issues without radiocarbon dates or a good relative chronological sequence, provided by stratigraphy. Unfortunately, the latest stratigraphic sequences on settlements in lowland East Yorkshire, such as Shiptonthorpe, have been extensively plough-damaged. Consequently, it has not been possible to identify phases of occupation later than those associated with the appearance of coins of the House of Theodosius. This contrasts with the several stratigraphic phases post-dating the mid-fourth century rebuilding of the fort at Malton, which suggest alteration of fort defences into the fifth century (Casey 1994, 261). Only the latest mass produced Crambeck ware and Huntcliff types were associated with the final alterations to the defences at Malton, suggesting that they remained in use well into the fifth century. If this was the case, the latest stratigraphic phases at Shiptonthorpe, containing late Crambeck and Huntcliff forms together with the latest Roman coin issues, could reflect occupation well into the fifth century.

8.2.3 Evidence for the appearance of an 'Anglo-Saxon' population

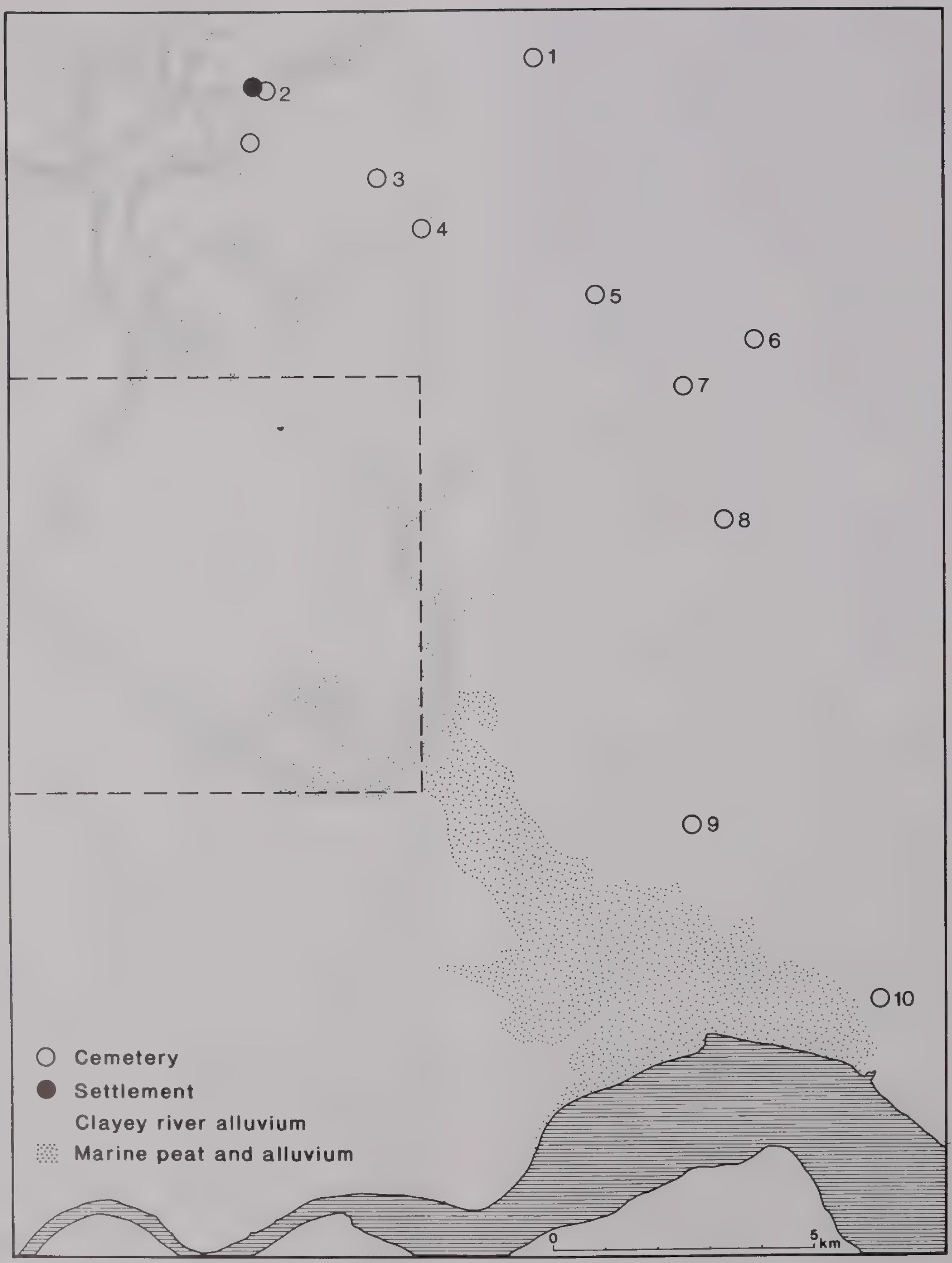
By the middle of the fifth century, users of a Germanic burial practice and material culture derived from the Low Countries, northern Germany and Denmark had founded what became a large cremation cemetery at Sancton Wold, on the southernmost extension of the Yorkshire Wolds, overlooking the Humber estuary and lowland East Yorkshire (Myres and Southern 1973, 11; Eagles 1979, 79; Timby 1993, 312). In the excavations carried out by Southern and Reynolds, over three hundred cremation urns were recovered. It is difficult to interpret the datable fifth-century urned cremations as anything other than evidence for a settlement of people from across the North Sea. The burial practice and the material culture are completely intrusive. Unfortunately, it is not possible to assess the size of any initial Germanic settlement, since many of the cremation urns do not contain any datable remains. The Sancton cemetery is the only burial ground undoubtedly founded before the late fifth century on the north bank of the Humber, and is the only large cremation cemetery known from East Yorkshire. The main focus for Germanic settlement on the Humber during the fifth century seems to have been the south bank of the estuary, where several large cremation cemeteries have been excavated (Eagles 1989, 209; Leahy *pers. comm.*). The Sancton cemetery reflects the northern extension of a Germanic settlement begun in the mid-fifth century. It may represent a central cemetery for the primary area of Germanic settlement on the north bank (Loveluck 1994, 69). The extent of Germanic settlement in this part of East Yorkshire at this time is unknown, but the paucity of dated fifth-century remains in other parts of the region suggests that initial settlement was limited to the north bank of the Humber and its immediate hinterland. Artefacts from cremation urns at Sancton indicate that it remained a cemetery focus into the sixth century, though for how long is unclear. The use of the cemetery into the seventh century can be questioned since diagnostic artefacts dating to this period are absent. Timby's mooting of the possibility of use of the cemetery into the seventh century is not backed up by any datable indicators to support her case (Timby 1993, 312). In contrast to the remains left by the fifth-century native inhabitants of East Yorkshire, artefacts from fifth- and sixth-century cremation graves at Sancton were derived *via* far-flung exchange networks. Large elephant ivory purse rings, glass vessels and rock crystal beads have been recovered (Timby 1993, 279-87). The elephant ivory must have been procured *via* exchange links with the Mediterranean, *via* intervening regions, and the glass vessels were probably imported from the old provincial workshops of the Rhineland. The source of the rock-crystal is uncertain (Meaney 1981, 77-82; Huggett 1988, 70).

During the late fifth or early sixth century, a new series of Anglo-Saxon cemeteries appeared all over East Yorkshire (Hines 1984, 109; 1992, 87). Those in lowland East Yorkshire are shown in Illus. 8.4. In these cemeteries, inhumation was the dominant burial practice, although small numbers of cremations have also been found within them (Mortimer 1905, 293). The cremations seem to have been interred early in the cemeteries' history (Hirst 1985, 171). A significant proportion of the inhumation graves were furnished with grave-goods, comprising dress accessories, artefacts associated with social display and others which may have been deemed of use within the context of early Anglo-Saxon notions of the afterlife. The furnished inhumations in these cemeteries, particularly the female burials, exhibit characteristics of what has been called 'Anglian' material culture. These include traits derived from south-western Scandinavia, such as wrist clasps in female dress (Hines 1984, 272-75), as well as the further development of artefact forms with their origins on the North Sea littoral of Germany and Denmark. Interpretation of what the appearance of these styles represents is a matter of debate: Eagles suggested that they represented a secondary Germanic settlement of East Yorkshire in the early sixth century and Hines also views migration as a possible mechanism of movement, while Hills chooses to stress the potential importance of other mechanisms of cultural diffusion, such as trade and exchange (Eagles 1979, 79; Hines 1984, 109; Hills *forthcoming*). The lack of a burial practice with peculiarly native characteristics, apart from a small number of hybrids in the Howardian Hills, the North Yorkshire Moors and further west towards the Pennines, suggests that the 'Anglian' cemeteries also contain the remains of the native population who had adopted new media of cultural expression (Loveluck 1994, 146-47; Loveluck 1997). These predominantly inhumation cemeteries are smaller than the cremation cemetery at Sancton Wold, though as a qualification it must be admitted that many are only partially excavated. The cremation cemetery at Sancton was itself replaced by an inhumation cemetery at Sancton Grange although, the idea of replacement may be too simplistic since it is quite possible that there was a period of overlap in the use of the two cemeteries, during the sixth century (Faull 1974, 9-10; Faull 1976, 232).

The widespread location of the 'Anglian' inhumation cemeteries is more likely to reflect the spatial distribution of the early Anglo-Saxon population, in relation to the settlement pattern, than the large cremation cemetery at Sancton. Unfortunately, the extent to which cemetery distribution reflects the settlement pattern is unclear. A single settlement could have used more than one contemporary cemetery, as was the case at Mucking, in Essex (Jones and Jones 1975, 168; Hamerow 1987, 257). In lowland East Yorkshire, the series of cemeteries founded between the late fifth - early sixth century were sited adjacent to the Roman road travelling from Brough to York. Indications from the Shiptonthorpe, Thorpe-le-Street and Hayton areas indicate that these burial grounds were also located in close proximity to late Roman settlement agglomerations along this road (Loveluck 1994, 131). While there is no evidence at present, it is possible that others were also sited close to old nucleated settlement foci. Aerial photographic evidence and limited excavation from the Hayton area suggests that an early Anglo-Saxon settlement was located adjacent to the late Roman settlement focus (Johnson 1978, 59), and occasional finds have indicated that this was succeeded by later phases of Anglo-Saxon occupation in its turn (Hull Museum Records). The Anglo-Saxon cemeteries, therefore, are likely to have been situated close to the Anglo-Saxon settlements which appear to have succeeded their late Roman antecedents. The Anglo-Saxon cemeteries founded from the late fifth century remained in use until the early seventh century, after which a new series of inhumation cemeteries were founded, the so-called 'final phase' cemeteries (Leeds 1936, 95-102; Boddington 1989, 179-82). The sites of four of these later cemeteries are known in lowland East Yorkshire (Illus. 8.4), though they are not the subject of discussion on the transformation from the late Roman to Early Anglo-Saxon period in this area. Where their location can be plotted in relation to those of earlier Anglo-Saxon cemeteries, Anglo-Saxon settlement evidence and late Roman nucleated settlements, it can be suggested that they reflect continual occupation of the same settlement zones from the Roman period to the late seventh century (Loveluck 1994, vol. 2, 26-27).

8.2.4 Thoughts on the social transformation of the fifth-sixth centuries A.D.

The contrast in the forms of archaeological evidence from the late Roman and early Anglo-Saxon periods results in an inability to analyze like indicators of change within lowland East Yorkshire, during the fifth century. One cannot compare late Roman burial practices with their early Anglo-Saxon counterparts, nor is it possible to compare excavated late Roman settlement remains with equivalent evidence from the Anglo-Saxon period. This fact has resulted in the easy



Illus. 8.4 *Map showing the distribution of Anglo-Saxon sites in broader study area and the Holme-on-Spalding Moor landscape block incorporating information from the former Humberside Sites and Monuments Record. Numbers refer to sites mentioned in the text*

equation of the fifth-century cremation graves at Sancton with Germanic settlers, and there is nothing in the evidence which is inconsistent with this interpretation. A far more difficult problem to understand is the response of the fifth-century native inhabitants to the presence of Germanic settlers.

Hints of native methods of display and of the development of a distinctive post-Roman native material culture are found, although significantly they have only been found in Anglo-Saxon cemeteries. The distinctive post-

Roman items take the form of brooches which were developments of types current in the fourth century, in particular penannular brooches. Only one penannular brooch was deposited in a context which is likely to date from the fifth century; this was included in a cremation urn at Sancton and is a form which was current in the late Roman period (Leeds 1945, 44; Fowler 1964, 146). If penannular brooches were an expression of native cultural identity, the presence of this brooch in this cremation urn might reflect either a native adoption of Germanic funerary practice or Germanic adoption of a native medium of expression at a time when neither medium for displaying identity was dominant. Other native penannular brooches from East Yorkshire are all distinct post-Roman types and have been found in sixth-century Anglo-Saxon inhumation graves. 'Type G' penannular brooches were recovered from graves at Kelleythorpe, west of Driffield, and at Londesborough on the south-eastern extension of the Wolds, overlooking the Vale of York (Mortimer 1905, 282; Swanton 1964, 273). Dickinson sees these brooches as fifth-to sixth-century products (Dickinson 1982, 53). A 'Type H/F' penannular brooch was also discovered in a cemetery at Staxton, in the Vale of Pickering. Unfortunately, however, its exact grave association is unknown since the cemetery was disturbed by the construction of a petrol tank (Sheppard 1938, 13). The only other dress accessory of possible native manufacture is a ring brooch from an inhumation grave at Londesborough. Suggestions have been made that this is 'Alamannic' in origin (Swanton 1967, 47) but Todd and Dickinson have argued convincingly that this brooch should be regarded as a development of a late Roman provincial type which could have been produced in Britain (Todd 1975, 388; Dickinson 1982, 56).

The further development of penannular brooch types from late Roman antecedents is a feature common to post-Roman British societies, primarily in areas away from those suggested to have been subject to significant Germanic settlement during the fifth century. Where they have been found in eastern England, they tend to occur in Anglo-Saxon graves. It is possible to view the further development of penannular brooches as an assertion of social position and ethnic or group identity on the part of elements of the native population, in response to the presence of new Germanic fashions. There seems little doubt, however, that within the East Riding of Yorkshire, Germanic traditions became dominant quickly, especially with regard to burial practice. That post-Roman penannular brooches are found only in very small numbers in female 'Anglo-Saxon' graves emphasizes the success of Germanic fashions in gaining dominance among an Anglo-Saxon population of both native and Germanic descent. In the rare instances where fifth-century native funerary practices did survive, they did so on the fringes of East Yorkshire on the edge of the North Yorkshire Moors, the Howardian Hills and further west towards the Pennines. In these areas, the native tradition of inhumation in stone cists survived, although from the sixth century Anglo-Saxon material culture started to accompany these inhumations. Examples have been found at Hebden Bank, Easthorpe; Spaunton, and at Occaney Beck (Elgee and Elgee 1933, 181-82; Waterman 1950, 440-41; Loveluck 1994, 141-42). They can be interpreted as examples of a hybrid burial practice where Anglo-Saxon fashions of dress were adopted within the context of a native funerary tradition.

The relative proportion of the Germanic and native components within the fifth- to sixth-century Anglo-Saxon population is unknown. The adoption of non-indigenous fashions by the native inhabitants could be explained by the desire to exhibit membership of a new social group, whose elites hailed from across the North Sea (Higham 1992, 225). Nevertheless, if the native population wishing to adopt these new cultural practices greatly outnumbered the Germanic newcomers it is surprising that the majority native population adopted Germanic Old English as its vernacular language. The opposite occurred on the Continent during the early medieval period. In the Frankish kingdoms, west of Flanders and the Rhine, the vernacular language of the former Roman provincial population was adopted by a numerically smaller Germanic elite. The same is true of Visigothic Spain, the Burgundian kingdom and Ostrogothic and Lombardic Italy. Higham has suggested that a small Germanic elite precipitated a total linguistic change in England, but in the face of evidence to the contrary in other parts of north-western Europe this theory does not explain why such a change should have occurred (Higham 1992, 191-93). On the Continent, a move from the use of the Roman provincial vernacular to a Germanic language did occur in Gallia Belgica, east of the river Canches, and in parts of the Roman provinces of Germania and Raetia. It has been suggested that the adoption of a western Germanic language in this area could be due to the social dominance of a Frankish elite rather than numerical domination (James 1988, 118). If this was the case, however, it is difficult to understand why the population of other parts of northern Gaul did not adopt the Frankish language, since a Frankish elite was also socially dominant in this area. Consequently, it would appear that linguistic change did in some way relate to the number of Germanic settlers and a wide social spectrum of Germanic speakers in a population as a whole. If this is also true of eastern England in the fifth and sixth centuries, one might suggest that the adoption of Old English was also a reflection of a significant Germanic settlement in this area.

The extent to which P-Celtic or Latin were spoken by the native population of East Yorkshire is unknown. No placenames derived from Latin or P-Celtic survive in this region today. Linguistic change may not have been a sudden event and a period of bi-lingualism can be envisaged. Bede's reference to John of Beverley's monastery 'inderawudu' may reflect a period when both P-Celtic and Old English were spoken (Colgrave and Mynors 1969, 457). The term 'inderawudu' is an example of linguistic syncretism, when names are constructed with elements meaning the same thing in more than one language. The 'dera' element reflects the modern Welsh 'deri' - a word describing woodland,and the 'wudu' element is the Old English for 'wood'. The compound noun therefore means the same thing in both languages. The two elements in the placename may not have been understood when Bede used the term, yet its bi-lingual origin may be an indicator of a period in the fifth and sixth centuries when both languages were spoken in East Yorkshire.

The recognition that a large proportion of the Anglo-Saxon population were of native origin is essential in our understanding of early Anglo-Saxon society. However, any attempt to try to deny the likelihood of a large scale Germanic settlement, in favour of a hypothesis suggesting that the native population were willing receivers of new media of cultural identity, must be balanced against the unlikely occurrence of a small group of Germanic settlers precipitating the abandonment of a language which had persisted through four centuries of Romanization. Small scale Germanic settlement and the native adoption of Germanic-derived fashions of dress and burial would not explain mass-linguistic change, if one refers to parallels on the Continent. Larger scale Germanic settlement alongside mass-acculturation, on behalf of the native inhabitants of East Yorkshire, would more readily account for the adoption of Germanic methods of both physical and linguistic expression. While this is a re-assertion of a hypothesis for a significant phase of Germanic migration, alongside the transmission of styles *via* other mechanisms such as trade, it is a rational explanation for linguistic change. In contrast to East Yorkshire, it is easier to suggest a small scale Germanic settlement or diffusion of cultural styles in areas such as the Peak District and Northumberland (Loveluck 1995). In these regions P-Celtic placenames and Old English names, relating to a distinct native population still survive (Hart 1981, 116). It is logical to suggest large-scale adoption of Anglo-Saxon styles by the native inhabitants of these areas, with linguistic change taking place over an extended period. Considering the total lack of P-Celtic placenames in East Yorkshire, linguistic change appears to have taken place more quickly, a fact not inconsistent with a relatively large immigrant presence.

Whether one adheres to the view that fifth- and sixth-century Anglo-Saxon graves represent the funerary remains of either a small number of Germanic settlers or a sizable immigrant element alongside an 'Anglicized' native population, the mechanics of the settlement and the development of early Anglo-Saxon society in lowland and other parts of East Yorkshire are unknown. It is possible that an incoming Germanic elite could have displaced a native elite, in addition to a wider Germanic settlement. It is also possible that some of the native population, including members of the elite, could have entered into alliance with an incoming population in an attempt to maintain peaceful relations and their social position. Adoption of Anglo-Saxon cultural traits could have been a by-product of such alliances. Scull has suggested that alliances between native and Germanic societies should not be seen as exceptional within the context of what may have been a very fragmented political situation during the fifth century (Scull 1995). Whatever the social relations resulting in the formation of an Anglo-Saxon society at the level of individuals, clan groups, elites and their dependants, only limited suggestions can be made with regard to the effect of these changes on the settlement pattern and the agricultural economy, in lowland East Yorkshire.

It has already been noted that along the Roman road from Brough-on-Humber to York, there appears to be a close correlation between the location of late Roman nucleated settlements and the siting of early Anglo-Saxon settlements and cemeteries. Without extensive excavation of any of these Anglo-Saxon remains it is not possible to draw conclusions on the nature of any relationship between the latest phases of occupation on the Romano-British settlements and the earliest evidence for the construction of their Anglo-Saxon successors; nonetheless, it is possible to make certain observations. In the latest phase of occupation on the settlement at Shiptonthorpe, it appears that the farm units were not respecting the orderly ditched enclosures of the third- to early fourth-century settlement. These had silted up or had been filled in and the latest buildings were placed on a different alignment, adjacent to the road (Taylor *pers. comm.*). In its lack of indications of formal planning and enclosed plots, the final phase of the Shiptonthorpe settlement may not have been too dissimilar to the layout of succeeding Anglo-Saxon settlements. If the evidence from Shiptonthorpe is typical of the layout of former 'ladder' settlements by the mid-fourth century, it is not necessary to see the character of early Anglo-Saxon settlements as intrusive in their basic form. The absence of ditched enclosures and the more loose agglomeration of early Anglo-Saxon settlements, suggested from the limited excavation at Hayton and aerial photographic evidence from the area, allows for the suggestion of a more organic development of settlement structure from the Romano-British to Anglo-Saxon period in the region. Such an organic development is also suggested from indications at Elmswell, near Driffield (Corder 1938; Mellor 1953, 262-64; Loveluck 1997), and has been demonstrated by Dominic Powlesland in his excavations on the ladder settlement at Sherburn, in the Vale of Pickering. The final phases of the settlement at Sherburn produced a fifth-century radiocarbon date and an Anglo-Saxon sunken-feature building, indicating continuous occupation of the settlement from the Roman into the Anglo-Saxon period (Powlesland 1988, 146).

Although the general layout of early Anglo-Saxon settlement agglomerations in East Yorkshire might be seen as an organic development from the structure of fourth-century antecedents, it cannot be denied that a new architectural form - the sunken feature building - appeared on early Anglo-Saxon settlements. The origin of this type of structure can be found in 'Germanic' Europe, beyond the Roman frontier (Todd 1972, 66-67), but their use cannot be attributed to peoples of Germanic descent alone. During the fifth and sixth centuries, they were used over a geographical area which covered eastern England, Scandinavia and north-west and south-eastern Europe, including Hungary, Romania and the Ukraine (Bóna 1976, 30; Heather and Matthews 1991, 57-59). The adoption of this architectural form can be seen as an expression of 'Germanic' influence, rather than Germanic presence in every instance. The character of 'halls' or 'houses' on early Anglo-Saxon settlements in lowland East Yorkshire can be assumed to be analogous to those from West Heslerton, in the Vale of Pickering, and from other excavated early Anglo-Saxon settlements (Hope-Taylor 1977, 46-149; Millett and James 1983, 200-46; Powlesland 1986, 167; O'Brien and

Miket 1991, 61-87 etc.). These buildings have characteristics inspired by both insular and Germanic traditions and as such can be regarded as hybrid early medieval forms (James, Marshall and Millett 1984, 205). Unfortunately, it is not possible to assess their similarity to immediate native forebears in lowland East Yorkshire. At Shiptonthorpe, the buildings from the final phase of occupation were either built on stone platforms or their foundations have been destroyed as a result of deep ploughing (Millett *pers. comm.*).

Away from the larger settlement agglomerations, the more isolated farmsteads may also have enjoyed continued development through the fifth and sixth centuries. The Anglo-Saxon pottery from the upper-most fill of a ditch from the native farmstead at Newham's Pit, Staxton, suggests continued occupation into the Anglo-Saxon period (Brewster 1959, 220-21). It is difficult to interpret this evidence as anything other than the adoption of new styles of material culture by existing inhabitants, rather than population displacement. There is no evidence for a break in the occupation of the site. The silting up or deliberate infilling of the farmstead enclosure ditches during the late Roman period may also reflect evolution from enclosed to more open settlement forms from the mid-fourth century.

Villas were the only Romano-British settlement form, surviving into the fifth century, which did not enjoy further development in a mutated form during the early Anglo-Saxon period. The fourth century de-Romanization of the character of these centres has already been discussed and their ultimate demise may relate to the final abandonment of expressions of Romanization in favour of new developments in the display of native identity at the personal level, as seen in penannular brooch forms. The absence of signs of Anglo-Saxon settlement adjacent to villas suggests that they could have ceased to be a significant settlement form before the arrival of any Germanic settlers. Alternatively, if they were still residences of the native aristocracy during the mid-fifth century, their abandonment could reflect their replacement by a Germanic elite who chose to settle among communities of extended clan groups (Scull 1993, 73), at pre-existing larger settlement agglomerations. Rather than the physical separation of elites from other social strata as during the Roman period, indicated by separate places of residence or villas, there does not appear to have been a physical separation of Anglo-Saxon elites from other members of the populace, in terms of distinct settlement forms. The closer proximity of elites with other Germanic and native clans could have had a positive influence on the speed of adoption of new Anglo-Saxon fashions by the native population. Constant exposure to the new structures of power, based on new methods of dress, speech and belief, on a personal level, within the same settlement would have resulted in more overt pressure to conform to new norms of behaviour. Such pressures would not have been so personally apparent if elites emphasized their difference from the populace by residing on different settlements.

Next to nothing can be said about the organization of the agricultural economy among the Anglo-Saxon population of lowland East Yorkshire during the fifth and sixth centuries but there is no environmental evidence which would suggest the need for a significant change in its organization during the immediate post-Roman period (Millett *pers. comm.*). An apparent lack of evidence for Anglo-Saxon settlement in the Holme-on-Spalding-Moor area, even after extensive field-walking and aerial photographic survey, suggests the possibility of the use of this area for transhumance water meadow, utilizing the more marginal land on the edge of Walling Fen (Taylor *pers. comm.*). The excavation of early Anglo-Saxon settlement remains at Hayton, including a sunken-featured building and a series of pits, indicate the undertaking of a range of practices associated with a mixed farming regime in the Foulness valley. A hearth also suggested the likelihood of metalworking on the Hayton settlement but it was very badly plough damaged and consequently no firm conclusion can be drawn about this activity (Johnson 1978, 75). Small finds also indicated textile production and possibly bone working (Cook 1978, 112-13).

8.2.5 Conclusions - transition and sudden change

It is possible to see aspects of the transformation from the late Roman to early Anglo-Saxon period in lowland East Yorkshire as indicative of both a sudden change and more gradual transition. The sudden appearance of users of a burial practice and material culture derived from across the North Sea at the cremation cemetery on Sancton Wold does suggest the settlement of Germanic immigrants in lowland East Yorkshire, from the middle of the fifth century. Their appearance may reflect a sudden political change in the hinterland of the north bank of the Humber at this time, though evidence for such an event cannot be sought from the archaeological remains. The settlement of Germanic people would have resulted in the sudden exposure of the native population to a new series of traditions of personal expression, in terms of dress, language and belief. The physical reflection of these new beliefs can be seen in the cremation burial practice. These Anglo-Saxon cremation graves also provide evidence for exchange links with the Baltic, the Mediterranean and areas of the old Gallic provinces under Frankish control, links for which there is no evidence on the part of the fifth-century native population. The character of the furnished inhumation graves which start to be interred in cemeteries all over East Yorkshire, from the late fifth century, is also completely intrusive.

The absence of distinctive native cemeteries in East Yorkshire, apart from on its fringes, suggests that members of the native population must be represented in these cemeteries, although they are not identifiable. The British population of the region appears to have adopted the new fashions of personal expression, in terms of appearance, within a short period of time. The lack of any observable attempt by Germanic elites to physically separate themselves from other members of the Germanic or native populace in separate elite settlements would have promoted the construction of new 'Anglo-Saxon' groups, due to the greater inclusiveness of communities personally interacting with elites on a daily basis. The desire of native elites to mark themselves out as separate, by putting a physical distance between themselves and possible tied settlements during the Roman period, could have promoted in an adversarial relationship which would not have resulted in mutual support at a time of political and social stress, such as a settlement of potentially hostile immigrants. The active association of the full social spectrum of Germanic immigrants with the inhabitants of tied settlements could have resulted in a common bond which was lacking between the native elite and its clients. Such a bond might be represented in the rapid adoption of Germanic-derived fashions to emphasize a new collective native and immigrant 'Anglo-Saxon' group identity which excluded any survivors of the native elite, the latter failing due to the desire to maintain the social status quo of the late Roman period.

At the level of individuals, it is possible to suggest a period of extreme short-term change and instability in the fifth and sixth centuries, but certain traits can be seen as the result of longer term developments and continuity of native phenomena. The evolution of many aspects of early Anglo-Saxon settlements and the landscape can be seen as the result of one of these long term developments. The more open unenclosed nature of early Anglo-Saxon settlement agglomerations may have been influenced by their immediate native predecessors. All the excavated native settlements seem to have evolved into settlements unenclosed by ditches in their final phases, although they may have been fenced. In this less formal use of space for the layout of farming units, they are similar to their Anglo-Saxon successors. It is possible to view this similarity as the result of a long term change in indigenous settlement form; however, an intrusive influence on the character of buildings cannot be denied. Sunken-feature buildings are a sign of Germanic influence, if not presence, although the character of houses with earth-fast foundations is derived from both native and Germanic influences. Consequently, the character of early Anglo-Saxon settlements appears to be the result of extended transitionary development with hybridization and adoption of foreign architectural styles, due to direct Germanic influence. There is no reason to suggest anything other than continuity with regard to the capacity of the agricultural economy, during the fifth and sixth centuries.

In addition to the reflections of long term change in settlement morphology and apparent continuity in the organization of production within the agricultural economy, it is also likely that the adoption of Old English as a first language took longer than the adoption of the physical accoutrements of Anglo-Saxon identity. The precipitation of a total linguistic change in East Yorkshire can be seen as a reflection of the scale of Germanic settlement, in addition to the social dominance of Germanic customs. The rate of adoption of the use of Old English probably related to the density of Germanic settlement in different parts of East Yorkshire and the degree of interaction between native and Germanic inhabitants. Bearing in mind the early indications of a Germanic population in lowland East Yorkshire and the association of Anglo-Saxon settlement with native predecessors, it is possible suggest rapid understanding of the new language, but it is not possible to say how long P-Celtic continued to be understood as a second language. With increased distance from primary areas of Germanic settlement it is also sensible to suggest a more gradual adoption of Anglo-Saxon cultural traits. The use of Anglo-Saxon artefacts within the native funerary tradition of stone cist burial, on the edge of the North Yorkshire Moors and the Pennines, can be viewed as an example of such a transition. In lowland East Yorkshire, however, indications of a gradual transition from the late Roman to early Anglo-Saxon period are outweighed by signs of sudden change. If one attempts to relate the evidence to the lives of individuals living through the middle of the fifth century, it is doubtful whether any long-term developments were appreciated as such, due to the extreme uncertainty of the time.

Acknowledgements

I am very grateful for the comments of Martin Millett, Jeremy Taylor and Bryan Sitch for their thoughts on the character of late Roman remains from Shiptonthorpe and Hayton prior to their publication. I am also grateful to Andrew Foxon and Bryan Sitch of the Hull and East Riding Museum and Arthur McGregor of the Ashmolean Museum for their help in studying the early Anglo-Saxon remains from East Yorkshire and to Kevin Leahy for his comments on the early Anglo-Saxon remains from the south bank of the Humber. I am also indebted to Helena Hamerow, Catherine Hills and Chris Scull for their comments on a draft of this paper.

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ISBN 0 902122 90 8